

2001

# Building Usability Into A New Web Site For The OPT-E-SCRIP(tm) Customized Medicine System

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**BUILDING USABILITY INTO A NEW WEB SITE FOR THE  
OPT-E-SCRIPT™ CUSTOMIZED MEDICINE SYSTEM**

**BY**

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**Thesis Advisor**

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**Submitted in partial fulfillment of the requirements  
for the degree of Master of Arts in Corporate and Public Communication  
Seton Hall University**

**2001**

## ACKNOWLEDGMENTS

The author wishes to acknowledge numerous friends and colleagues for helping to support his study. Specifically, the author expresses his appreciation to Dr. Michael McGraw, Dr. Patricia Kuchon, Dr. Donald Lombardi, Dr. Donald Reitberg, Fred Huser, Dr. Walt Guarino, J. Mark Horn, Dr. Nardo Zaias, Malvina and Sid Weiss, Greg Gilbert, Esq., and the entire staff of Opt-e-scrip (including Ganesh V.). He also extends his thanks to friends who read earlier drafts and kept his spirits up during the entire thesis-development process: Donna Owczarek (who also did a great job in helping the author design Web pages), TA Higgins, Tammy Beltle, Paul Carlisle, and Maria Kantouros. The author is especially grateful to his family—Beverly O'Hearn, José M. and Ada del Rio, Dr. Julia Gallardo—for their constant encouragement, patience, and support throughout the research and writing of this report. Finally, the author wishes to thank his wife and friend Dr. Eve del Rio, for inspiring him to attain his most challenging and rewarding academic achievement.

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## Chapter I

### INTRODUCTION

Two parallel revolutions are underway; one in e-healthcare, and the other in Web-site usability. Both have in common the goal of empowering the user; both will transform the role of service professionals into one of interactive and customized facilitation. As these areas converge, approaches that help users cut through the ever-increasing clutter of information to find or apply precisely what they need, as they need it, will emerge as the businesses most favored by an increasingly Web-savvy public.

By 2005, 88.5 million adults will use the Internet to find health information . . . consumer demand for healthcare content has already reached critical mass—an estimated 36.7 million adults—and will continue to grow at roughly twice the rate of the overall online population. (“Online health information seekers,” 2000, ¶ 1-2)

Some forecasts are even higher. Datamonitor plc (1999) predicts the global healthcare Internet user population as growing to 174 million by 2003, and recent surveys of the U.S. Internet user population cited by Datamonitor plc have confirmed that healthcare is now the leading area of interest for Internet users. Likewise, iMarketing News (“Merck-Medco, CVS deal,” 1999) predicts that the online healthcare market will reach \$1.7 billion by 2003.

Clearly, the e-healthcare revolution is underway. A recent Harris Poll (as cited in Taylor, 2000a) finds that there are now fully 98 million “cyberchondriacs,” an increase of 44 million since July 1998, and that the proportion of those on-line who have used the Web to look for health or medical information increased to 86%, up from 71% in July 1998. The Pew Internet and American Life Project (as cited in Fox & Rainie, 2000) calls

the 52 million American adults that have used the Internet for healthcare information “health seekers”; 15 million do so weekly, and 70 percent said the information influenced their decisions about treatment and care (p. 3). In addition, the Healtheon Corporation May 1999 Internet Survey of Medicine (as cited in Datamonitor plc, 1999) found that 85% of 10,000 MDs surveyed are using the Internet: a twofold increase over three months earlier, when only 42 percent of survey participants used the Internet, and an 875% increase over 1997. The same survey found that 63% of MDs use e-mail daily, and 33% use e-mail to communicate with patients (p. 35). In addition, U.S. corporate spending on Internet technology in the healthcare industry is projected to be \$11.5 billion, at a 57% compounded annual growth rate (Anders, 1999, p. R6).

In terms of the overall Internet context, according to the Computer Industry Almanac (as cited in Petska, 2000), the U.S. has over 112 million Internet users as of year-end 1999, which is nearly 40 percent of the worldwide total (§ 1). “Six out of every ten American adults (59%) are now on-line, up from 56% at the end of last year, 44% in 1998, 30% in 1997, 17% in 1996, and only 9% in 1995” (Taylor, 2000b, § 1).

As these e-healthcare trends coalesce, empowered patients, information-enabling health professionals, and customer-focused e-care will soon become the standard, or as Pryor (2000, as cited in Goldstein, 2000) puts it, “The ‘right’ test, therapy, or procedure, provided at the ‘right’ time, in the ‘right’ setting, in the ‘right’ way, by the ‘right’ health care provider” (p. xvi).

A corresponding customer focus on scouring Web pages for information is prompting progressive Web site designers to factor more usability into their page layouts,



content, and information architecture. Amidst ever-increasing information overload, especially in healthcare, simplicity is becoming a distinguishing competitive attribute.

The confluence of these two trends is the driving force behind the design of this thesis/project, a home page for the Opt-e-scrip™ customized medicine system. The basic premise of Opt-e-scrip is that less reliance on healthcare shown to be unnecessary can ultimately add value and lead to more favorable health outcomes. As a prognostics company (see Appendix A), Opt-e-scrip enables physicians and pharmacists to test patient reactions to drugs and placebo for therapeutic categories by offering test components (kits) and then statistical evaluations; in short, customized medicine.

To succeed, Opt-e-scrip will need to communicate its many significant benefits over off-line pharmacies, including “greater convenience, larger product offerings, enhanced consumer privacy and cost savings . . . [however, it faces the significant challenge of] generating a competitive mass of users” (Datamonitor plc, 1999, p. 17). The key attributes that were noted as defining online pharmacies in 2000 were: health insurance plan coverage, personalized advice, content and privacy, convenience stemming from offline and online retail integration, and streamlined administrative processes surrounding paperwork and medical records (“Merck-Medco, CVS deal,” 1999, p. 50)

Although the environment of rapidly expanding healthcare technology and online care management is idealized in current literature, the content, connectivity, commerce, context, communication and community challenges to e-pharmacy operations are considerable. This is especially true in light of unprecedented spending by pharmaceutical companies on direct-to-consumer advertising, exclusive marketing

alliances being forged at high levels, as well as the many confidentiality, privacy and regulatory concerns on the horizon.

The author has two reasons for helping to design the Opt-e-scrip Web site and reviewing literature on the topic. His wife, Eve del Rio, Ph.D., is vice president, clinical research and operations, for Opt-e-scrip, Inc., Morristown, N.J., a startup whose initial marketing efforts are otherwise limited by first-phase venture-capital funding. In addition, the leading healthcare Web sites appear to be some of the more egregious violaters of Web usability standards and principles, and so constitute an acceptable study sample for comparison and improvement.

#### Research Question

How can a Web site convey the concept of customized prescription/managed pharmaceutical care, without violating the established principles and latest findings on Web-page usability? This project explores that question through detailed analysis of landmark sources on Web usability and e-healthcare, as well as Web information architecture and single-patient ( $N=1$ ) trials.

#### Subsidiary Questions

This project will also work to address, at least in part, the following questions:

1. How can Opt-e-scrip use its Web site to provide a Web service? (i.e., customer service and transactions; "on-line category killers are Web services . . . that focus on delivering products or services in one particular market niche" (Goldstein, 2000, pp. 5, 28)
2. How can Opt-e-scrip establish a standard or benchmark for proper Web usability in e-healthcare?

3. How can Opt-e-scrip overcome the barriers of confidentiality and privacy concerns, to fully utilize the interactive and hypertext nature of the Web?
4. How can Opt-e-scrip utilize the latest advances in technology (e.g., wireless information devices, interactive use of cellular phones, voice recognition software) to increase physician and consumer utilization and compliance?
5. How can the Opt-e-scrip unique product and message best be heard above the competitive "din" of large-scale pharmaceutical and national-Web-portal-alliance marketing?
6. How can Opt-e-scrip build a quality, user-friendly list of links to other managed healthcare resources and online support groups for chronic populations, to generate the most traffic and repeat visits from its target audiences while building a sense of community?
7. How can the Opt-e-scrip Web site "allow patients to cut through information overload today to find the content that is most related to their personal interests and priorities" (Goldstein, 2000, p. 160) in the same tailored way used by the Opt-e-scrip product to deliver care?
8. How can the Opt-e-scrip Web site begin to break down the traditional resistance of physicians to communicate regularly and effectively with their patients between medical visits?
9. How can the Opt-e-scrip Web site begin to break down the traditional resistance of both patients and physicians to managed care initiatives that previously were directed more at cost savings than at optimizing care?

### The Product: Opt-e-scrip Web Site

Burgeoning prescription-drug costs and trial-and-error prescription of medication for chronic illnesses have created the need for a valid clinical-trial method that: (a) rationalizes the use of drug therapy for chronic conditions, and (b) identifies optimal drug therapy and dosing on an individual-patient ( $N=1$ ) basis (Huser & Reitberg, 2000, p. 3).

Opt-e-scrip, a relatively inexpensive system of proprietary diagnostic kits, a prescribing decision model, and a database with a patent pending, will statistically prove what drug, if any, at what dose is optimal for an individual patient. Opt-e-scrip is a new paradigm in evidence-based medicine: a continuously updating database of therapeutic outcomes combined with individual patient data in real time. While this product and service can be provided via any distribution channel, "it is particularly well suited for the growing segment of Internet business-to-business health care" (Huser & Reitberg, 2000, p. 3), through which test-kit data can be collected, analyzed, and reported quickly and accurately.

For this reason and several others, a Web site was developed for Opt-e-scrip as a thesis-project. The Web sites that most closely parallel the Opt-e-scrip business model are also examined, that is, Internet/mail-order retail pharmacies, perhaps involving "collaborative practice" methods, that sell directly to patients with mild to moderate chronic conditions (Dr. Donald P. Reitberg, personal communication, September 24, 2000).

The Opt-e-scrip system includes a self-administered diagnostic kit that is used to collect clinical results of drug performance for an individual patient. These data are then

combined with results from a database of like patients. The result is an objective, statistical method of determining if drug therapy is called for, and if so, what is the most cost-efficient means of providing it.

These test kits would determine: (a) if and when drug is better than placebo, (b) when an alternate, lower-cost substitute may provide a better benefit than a branded product, and (c) what dosage levels represent the optimal crossover point between efficacy and side effects.

#### Market Analysis and Market Direction

A key differentiator between Opt-e-scrip and other Internet pharmacies is that Opt-e-scrip first prequalifies patients based on their individual needs, and then, if appropriate, retains these patients by supplying their refill prescriptions conveniently at a reasonable price (i.e., offering a differentiated, customized product frees Opt-e-scrip from having to compete solely on price to attract new patients). Importantly, the Opt-e-scrip product line need not be sold through the Internet, but instead could obtain distribution through mail-order pharmacies, with prescriptions written by trusted local doctors everywhere.

Another key differentiator is that Opt-e-scrip is targeted to mild to moderate chronic disease sufferers, who are believed to be more likely than short-term disease sufferers and casual or "browsing" Web users to actively participate in managing their diseases. The Opt-e-scrip system will not only identify possible adverse drug-drug interactions, but also the dosing regimens that are least likely to produce side effects. In general, pharmacy benefit managers (PBMs), health maintenance organizations (HMOs), and retail pharmacies are perceived as currently lacking the necessary combined clinical, epidemiological, biostatistical, manufacturing, and marketing expertise of the Opt-e-scrip

team. Focusing product offerings and services on particular product categories (e.g., depression, as with the former PlanetRx.com satellite health channel, [www.depression.com](http://www.depression.com); PlanetRx closed its store on March 12, 2001) will help overcome difficulties in distributing products that all require distinct promotional and marketing methods (Datamonitor plc, 1999).

The first two areas to be targeted by Opt-e-scrip will be allergic rhinitis and antiulcerants (for gastro-esophageal reflux disease, or GERD). Drugs for osteoarthritis, antidepressants (serotonin reuptake inhibitors, or SRIs), and hypertension will follow these categories.

Given the potential limitation of doctors being less likely to access the Internet, Opt-e-scrip may offset this in part by providing handheld Web devices or cellular phones to those who prescribe the most drugs in Opt-e-scrip targeted categories, taking into account the historic objections of usability guru Jakob Nielsen to wireless application protocol (WAP) technology (e.g., "its services are poorly designed, have insufficient task analysis, and abuse existing non-mobile design guidelines . . . m-commerce's prospects are dim for the next several years," Nielsen, 2000h, ¶ 1).

One goal of the site is to help physicians trade time spent on paperwork that is viewed as intrusive and valueless, for data that supports their prescription regimens in the face of often-overwhelming pharmaceutical-company marketing efforts. Use of this supportive data is also projected to actually reduce or at least neutralize perceived interference from managed care organizations (MCOs).

The overall marketing strategy will be to position Opt-e-scrip technology as a breakthrough method that can improve clinical outcomes for doctors and patients while

also saving MCOs significant amounts of drug expenses. The key Web-site message will seek to convince consumers that, for the first time, they can know with certainty that they are using an effective prescription medication with tolerable side effects. Also, if consumer conditions are not benefiting from drug therapy, Opt-e-scrip will also help them determine whether they need to be on a prescription medication at all.

The Web site will also serve as a means of building awareness and trial of the Opt-e-scrip system among physicians and MCOs, with cross-selling via a detail sales force, advertising (direct mail, medical-journal advertising), and convention attendance. Trial is particularly well-suited for the Web, which tends to provide a “taste” of content for free, to induce payment for a “full serving” of detailed information or specifications.

#### Design Elements

Development of a Web site will be key to the success of Opt-e-scrip. A key challenge will be to distinguish the Opt-e-scrip Web site from perceived competitors (e.g., [www.healthcentral.com](http://www.healthcentral.com), [www.healthdesk.com](http://www.healthdesk.com), [www.drugstore.com](http://www.drugstore.com)) not simply on the basis of more or better features, but especially on the basis of Web usability; that is, if customers cannot easily find the product features and benefits on the Web that matter most to them, then they will not buy those products (Nielsen, 2000b).

To safeguard privacy, patients will be identified by number and initials only.

In addition, the links and patient-information pages (see Appendix D) would be the only ones currently directed toward consumers, with more technical information being directed toward medical professionals on a separate Web page.

As Table 1 shows, this site intends to ultimately provide a fast, convenient, accurate and user-friendly vehicle for conveying information of value to and among physicians, Opt-e-scrip pharmacists, and patients.

Table I

Physician/Consumer/Investor Information, Opt-e-scrip.com, Phase I

<u>Physician Information</u>	<u>Consumer Information</u>	<u>Investor Information</u>
Order form for brochures; product photos/diagrams	Opt-e-scrip team profile, bios; photo/map of building	Business-plan slide show
Overview of <u>N</u> = 1 trials and steps involved (flowcharts)	"Ask Your Doctor" contact-information box	Preliminary findings from beta-site trials; links to current news articles
Sidebar spelling out benefits to physicians	Sidebar spelling out benefits to consumers	Sidebar spelling out benefits to investors
Site-specific search/browse mechanisms	"Opt-e-My's" section; information on targeted chronic-disease issues; prequalified links (some to online support communities)	Opt-e-News; alerts visitors to latest developments; list of upcoming events; media schedule; use of new technology
Frequently Asked Questions	Frequently Asked Questions	Frequently Asked Questions
E-mail newsletter signup; form for test-kit orders	Interactive surveys regarding site content, medical issues	Contact Us section
CME credits section	Registration code entry to secure medical diary form, quality-of-life questionnaires	Registration form for off-site access to business plan, other sensitive information
Testimonials from trusted medical organizations	Privacy/confidentiality policies, "approval" seals	Interviews with key healthcare analysts
Service-agreement verbiage	Legal disclaimers	SEC compliance verbiage



Phase II information could include more sensitive and complex transactions related to reimbursement, such as conveyance of test-kit prescriptions and patient insurance-coverage information and/or payment.

Since patient distrust of any plan-sponsored initiative is a primary obstacle, protection of patient confidentiality through leading-edge Web-site security will be an important consideration, as is assurance that such information would not be used to deny patients access to certain therapies based on their potential cost.

In addition, the site will offer an alternative method of response to the aforementioned cross-selling and advertising efforts, as well as a place to order more detailed information, sign up for an e-mail newsletter, and refer other physicians to Opt-e-scrip.

#### Definition of Terms

1. Chronic illness. Illnesses which are prolonged, do not resolve spontaneously, and are rarely cured completely ("About chronic disease," 1999, ¶ 1).

2. Credibility. Believability; or, a perception based on two factors: trustworthiness (unbiased, truthful, good, honest) plus expertise (experienced, intelligent, powerful, knowledgeable). There are four types of credibility: presumed (assumptions), reputed (reference from a third party), surface (what we find on simple inspection), and experienced (past experience with a site; Fogg, 1999).

3. Customer experience gap. The difference between what customers want and what they get (Hurst & Gellady, 1999, p. 2).

4. Customer-focused health management: "A comprehensive, integrated, coordinated, information-based approach to health care with the objective of continuously

improving the quality/cost ratio (value) of patient care with multimedia interventions” (Goldstein, 2000, p. 133). Uses Web technology to increase efficiency and customization, and leverages Web technology to address the needs of consumers as well as providers and payers.

5. Customization. Customization is under direct user control: the user explicitly selects between certain options. This differs from personalization, driven by the computer, which tries to serve up individualized pages to the user based on some form of model of his or her needs. The real way to get individualized interaction between a user and a website is to present the user with a variety of options and let the user choose what is of interest to that individual at that specific time. If the information space is designed well, then this choice is easy, and the user achieves optimal information through the use of natural intelligence rather than artificial intelligence (i.e., tailor the information seen and skipped so that it suits users’ needs perfectly). Personalization works best if the site can gather information about users unobtrusively (e.g., users enjoy faster processing or user-weighted search results if they keep ordering from one site rather than competing sites; Nielsen, 1998d, ¶ 4-5; Nielsen, 1997b, ¶ 15).

6. Information architecture. “The design of organization and navigation systems to help people find and manage information more successfully . . . identifies and specifies the ‘subset’ of ways to organize information, given the information needs of the users, the nature of the content, and the goals and constraints of the sponsoring organization . . . users will spend less time finding information, and are less likely to miss finding what they need altogether” (Rosenfeld, 1999, as cited in Rhodes, 1999, pp. 85-87). In other words, how everything is organized.

7. Interactive. The ability to change by soliciting and using feedback.

8. Placebo. Pharmacologically inert drugs given to some of the subjects in so-called double-blind studies of new drugs, in which neither the subjects nor the researcher know who is getting what. If the placebo produces the same results as the active drug, then the active drug is thought to be unnecessary. Studies since [1955] have shown placebos working for certain conditions—pain, depression, some heart ailments, gastric ulcers and other stomach complaints—in close to 50 or 60 percent of subjects, sometimes more. Indeed, it is not unheard of for placebo effects to exceed those attributed to the active drug. Placebo treatment could prove useful for conditions like mild to moderate depression, pain, asthma and hypertension, in which a placebo has shown to be especially potent, and in which distress plays an aggravating role. Several studies show that the rate may be more like 50 percent for depressions that have lasted less than 3 months, especially if they were also triggered by a specific event (Talbot, 2000, section 6, p. 34).

9. Satisficing. A cross between satisfying and sufficing; choosing the first reasonable option, as opposed to considering all of the available options, then choosing the best one. Satisficing is a common behavior for those seeking information on Web pages (Krug, 2000, p. 24; also see p. 71).

10. Self-explanatory. Where “the appearance of things, their well-chosen names, the layout of the page, and the small amounts of carefully crafted text should all work together to create near-instantaneous recognition” (Krug, 2000, p. 18).

11. Tailoring: Creating ‘segments of one’ by designing interventions to fit the set of characteristics and needs that are unique to each person (Goldstein, 2000, p. 159).

12. Trust. Customer willingness to invest time, money and personal data in an e-commerce site in return for goods and services that meet certain expectations—in other words, the perceived chance of a purchase without any hassles (Molich, 2000, p. 1).

13. User experience.

User experience encompasses all aspects of end-user interaction with a company, its services and its products—the initial encounter, purchase, setup, usage, service, replacement, and so on. The services and content are what define the user experience, together with the feeling of flow that one gets when moving around an easy site. The first requirement for an exemplary user experience is to meet the exact needs of the customer. Customers demand convenience, value and pleasure from their products and services. They need products and services that enrich their lives, that satisfy their real needs, work without fuss or bother, and without the need for lengthy training or continual attention. Quality user experience goes far beyond giving customers what they say they want or providing checklist features. Human-centered design requires corporate commitment. The results are faster design cycles, increased sales and customers who are more satisfied and more loyal. (Nielsen, Tognazzini, Laurel, & Norman, 2000, p. 1)

14. Web usability. The process of designing the Web business model, project management, information architecture, page design, content authoring, and linking strategy so that the Web customer can find, and thus, buy the product or service being offered, and/or perform the useful task desired, in the simplest possible way. This is accomplished by placing customer needs at the center of a Web strategy. The concept of Web-site usability “really just means making sure that something works well: that a

person of average (or even below average) ability and experience can use the thing . . . for its intended purpose without getting hopelessly frustrated . . . If something is hard to use, people just do not use it as much" (Krug, 2000, pp. 5, 9). "Loyal users are the only true value on the Internet, and users do not return to sites that are too difficult to use" (Nielsen, 2000b, p. 389). "You want people to be able to find answers . . . to understand what they are doing, when they are doing it" (Nielsen, 1999, as cited in Rhodes, 1999, p. 5). "Usability is the broad discipline of applying sound scientific observation, measurement, and design principles to the creation and maintenance of Web sites in order to bring about the greatest ease of use, ease of learnability, amount of usefulness, and least amount of discomfort for the humans who have to use the system" (Pearrow, 2000, p. 12).

Additional definitions of terms used throughout this thesis can be found in Appendix A.

### Limitations of the Thesis

To present the most current picture of two rapidly emerging fields—e-healthcare and Web usability—sources obtained, specifically, relevant literature, are the most recent available, and in most cases, no more than 2 years old. Likewise, to keep the scope manageable, and to focus on addressing the research question, discussion will be limited, where possible, to Web applications for retail pharmacies that specialize in treating mild to moderate (i.e., not acute or life-threatening) chronic conditions.

Although a number of Web writing, design, and coding resources have been consulted, the overriding focus of the research presented is on implementation of novice-level Web usability techniques. A further limiting factor is that one of the landmark

texts, Designing Web Usability, notes that instructions of how to gather project- and customer-specific insights regarding usability will be included in a followup text, tentatively titled Ensuring Web Usability, but which is as yet unpublished as of this writing. According to Kathy Malmloff (personal communication, January 22, 2001), product marketing manager, New Riders Creative Media, "Jakob [Nielsen] is extremely busy so [the book may be out] closer to the beginning of 2002." The current book describes the "what," or guidelines to follow, but not the "how," or methods and procedures to follow to learn even more about user behavior, as well as to acquire specific data about customers and how they interact with an actual site.

Regarding the use of surveys, although this is a fairly common practice in thesis development, it can actually obscure more than it uncovers when it comes to Web usability research and projects. "A survey is virtually useless . . . you must watch users. You must observe their behavior. You must understand their performance, not their preference" (Nielsen, as cited in Rhodes, 1999, p. 7). "What people say and what they actually do are two very different things. So it is usually worthless to ask users to fill in questionnaires. You will learn little about their behavior and how to serve them better" (Nielsen, 2000b, p. 382). In other words, do not trust what customers say, but trust what they do. "Traditional market research methods do not work for the Web . . . one cannot ask users what they want and expect the answer to have any relation to their actual behavior when they go online . . . this said, short surveys are still good for simple questions like 'why are you visiting our site' that relate to user opinions instead of assessing the design" (Nielsen, 1999g, ¶ 3, ¶ 15). "Evaluating something is a very different user experience than using something for a self-imposed goal (the normal way

people use the Web) . . . This phenomenon also explains why it is invalid to measure usability by asking a survey panel to check out a site and rate it on a questionnaire” (Nielsen, 1999a, ¶ 9).

### Limitations of the Project

The main appeal of the Opt-e-scrip Web site is business-to-business (i.e., pharmacist  $\leftrightarrow$  physician), and the main objectives are to: (a) communicate how to order test kits, (b) to advocate/educate how their use is a helpful, and time-saving, tool in pursuing evidence-based medicine (“do no harm,” as per the Hippocratic Oath), and (c) to build an experience base so that Opt-e-scrip is “Web-ready” once the expected publication in a leading peer-reviewed medical journal takes place months from now (i.e., December 2001 or later). The Web site is not presently pursuing true e-commerce functionality, such as ordering/fulfillment, data collection, and data reporting; monetary transactions and reimbursement are currently limited to conventional means, such as payment by credit card over the phone, or by check. Also, by law, a retail pharmacy is not allowed to advertise specific drugs. In addition, according to Metcalfe’s Law, which states that the value of a network increases exponentially as the number of connections increases (Levine, Locke, Searls, & Weinberger, 2000, p. 83), the true value of the site will not be realized until enough medical users learn to take advantage of it. In its present iteration, the site does not blend pharmaceutical sales with those of vitamins, health and beauty aids, plus other like products, to take full advantage of impulse buying and higher profit margins; referral and viral-marketing programs also need to be developed. The consumer portion of the Opt-e-scrip Web site also needs to appeal to women, as, according to Dr. Steven Rauscher (as cited in “Web trends,” 2000-01), “studies show that

women between the ages of 35 and 55 are the most active searchers of medical information on the Internet" (p. 11). Affiliate links (e.g., from Girlstuff.com to Drugstore.com) illustrate this growing trend.

The look of the Web site is deliberately being kept conservative, to enhance its credibility with physicians, as well as to make it easier to download and maintain. "Most physicians feel that much of the medical information available over the Internet is not of sufficient quality [due to the belief that] 'consumerization' of medical content to make it accessible to the patient population is not appropriate . . . [also] many customers wishing to fill prescriptions online would prefer a more conservative, traditional, uncluttered format" (Datamonitor plc, 1999, pp. 61, 201). What these users want most are Web pages that are clearly segmented, easy to understand, with security and pharmacist-qualification assurances, an appropriate promotional mix (i.e., minimal banners), clearly promoted short-term benefits (vs. detailed explanations of how systems operate), and service simulations (interactive examples/demos of how online transactions would work) . . . in addition, "those online pharmacies wishing to concentrate on prescription-only medicines need their brand to be associated with quality assurance, the provision of accurate, detailed product information, and medical responsibility" (Datamonitor plc, 1999, pp. 172, 199).

The most likely strategy is that Opt-e-scrip will form alliances with offline pharmacies that already have established brands. Under these alliances, the offline pharmacy then promotes the switch of its existing customers to the services of the online pharmacy (Datamonitor plc, 1999, p. 200).



The tone of the writing must also be technical enough to be respected by knowledgeable medical professionals, yet accessible enough to make sense to other important target audiences, such as potential venture capitalists and consumers.

As was stated in The Cluetrain Manifesto (Levine et al., 2000), "Hypertalk encourages stories [and thus understanding, as opposed to just more information] . . . Markets are conversations [expressions of individual voice looking for response] . . . the human voice comes of focus, attention, caring, connection, and honesty of purpose . . . replacing the brochures with ways to ignite dialogues" (pp. 148-149). In other words, it is better for health-related sites to eschew hype in favor of craft: "[engaging] work by unique individuals motivated by passion [for quality] . . . things we do that we actually care about" (Levine et al., pp. 113, 163). Possibly due to lack of qualifying in-person cues, the tone of "voice" in Internet writing is crucial, because it also serves as metacommunication that visitor time and interests are respected—the direct opposite of the "passive consumer" stereotype, once described by industry analyst Jerry Michalski (as cited in Levine et al., 2000) as "a gullet whose only purpose in life is to gulp products and crap cash" (p. 78).

It must also be remembered that the Web is an interface to reality, not necessarily the reality itself; it is still deficient in the service and interaction areas. "User choices are insufficient as the only basis for interface prioritization . . . other mechanisms must be employed as well to guide users to things they did not know they needed" (Nielsen, 1999c, ¶ 14).

Launching new Web sites is particularly challenging, especially in the area of online pharmacies (e.g., PlanetRx.com closed its doors on March 12, 2001;

OnHealth.com was acquired by WebMD.com on March 31, 2001). "Impatient users imply increasing difficulties in launching new websites, since the users will not bother with anything that requires additional learning time. Usability becomes a barrier to entry: a new site will fail unless users can grasp it in a few seconds . . . New entries in established categories need to have at least twice the usability of the main existing sites. Luckily, this is easy to achieve since most existing sites are so bad" (Nielsen, 1999f, ¶ 3, ¶ 17). Unlike other media, "on the Internet, switching costs are low. If you do not find what you want, the competition is only a mouse-click away" (Nielsen & Norman, 2000). Nielsen adds that "the odds are against any company that wants to put up a website: In my estimate 90% of commercial websites have poor usability" (Nielsen, 1998h, ¶ 1). Even with established sites, five levels of complexity need to be overcome before users can begin to accomplish any goal or use any feature on the Web: the operating system (PC), TCP/IP (getting online), browser (Microsoft or Netscape interface), HTML (links), and add-ons (anything more; Hurst & Gellady, 1999, p. 9).

The last limitation is that usability, while a valuable tool, is not infallible, nor is it a panacea. "Unless you are a usability professional, there is a limit to how much is useful to learn" (Krug, 2000, p. 6). As opposed to always making the complex simple, sometimes, things are just more complex. In addition, usability (resale, word of mouth) is always secondary—a means, not an end—to ensuring that an initial purchase is made (marketing); ease of use is irrelevant if the customer does not purchase the item (Norman, 2000, as cited in Nielsen, Tognazzini, Laurel, & Norman, 2000, pp. 3, 9). Despite the testing that is involved, "usability specialists often do not have a good feel for how greatly user information needs can vary, and how those different needs can have a huge

impact upon retrieval performance” (Rosenfeld, 1999, as cited in Rhodes, 1999, p. 86).

Finally, “usability advocates and security people have opposite goals that create a fundamental conflict: Usability advocates favor making it easy to use a system, ideally requiring no special access procedures at all, whereas security people favor making it hard to access a system, at least for unauthorized users” (Nielsen, 2000g, ¶ 3, ¶ 4). This is a particular concern regarding confidentiality and privacy concerns, which will be covered later in this thesis (see p. 45).

## Chapter II

### E-HEALTHCARE AND OPT-E-SCRIP

#### Introduction

In the following two chapters, the author will present the most recent general trends that relate to e-healthcare, integrate information that emerged from a review of the literature, and then comment directly how that information relates to the project, the Opt-e-scrip Web site. Interwoven throughout, rather than in a separate chapter, will be aspects of how this research was conducted, how the project was designed and tested, the overall conclusions that were reached, and future steps to be considered.

Mass marketing, dispensation, and consumption of prescription drugs have risen to all-time high levels in American society. According to a recent Associated Press (2000) poll, "about six in 10 Americans consider prescription drugs a 'very important' issue in their vote for president, and about that many say either they or someone in their family takes such medicines regularly" (§ 1).

This trend disproportionately affects those who suffer chronic illnesses. Chronic illnesses are those which are prolonged, do not resolve spontaneously, and are rarely cured completely ("About chronic disease," 1999, ¶ 1). Goldstein (2000) notes that "about 85 percent of our national health care dollars are spent on the treatment of chronic disease . . . managed care plans have become very interested in the alternative therapies that can help minimize the cost of care for chronically ill people" (p. 107) and adds that "on average, health care costs for individuals with chronic illnesses are three times the cost of care delivered to others" (J. Christianson et al., as cited in Goldstein, 2000, p. 141).

Taken together, these trends indicate that the current method of prescribing the prescription pill du jour to rein in the growth of chronic illnesses and their associated costs is not working. As a result, more chronic-illness sufferers are turning to the Web for answers. In a recent Harris survey (as cited in Taylor, 1999), the diseases which generated the greatest use of the Web were depression (19% of so-called “cyberchondriacs”), allergies or sinus (16%), cancer (15%), bipolar disorder (14%), arthritis or rheumatism (10%), high blood pressure (10%), migraine (9%), anxiety disorder (9%), heart disease (8%) and sleep disorders (8%; ¶ 9). These categories correspond quite well with those targeted by Opt-e-scrip, which currently include allergic rhinitis, gastro-esophageal reflux disease, osteoarthritis, depression, hypertension, and cholesterol reduction.

By applying the principles of Web site usability, Opt-e-scrip intends to connect with these communities and their caregivers in focused and meaningful ways. “People with chronic diseases or conditions are participating in e-care on a daily basis by entering health data, joining on-line support groups, downloading information related to their conditions from secure Web services (sanctioned by their doctors) . . . they are building long-term relationships with organizations that support cost-effective, efficient access to health and medical products and services through the Internet” (Goldstein, 2000, p. xxiii).

### Background

Opt-e-scrip is the brainchild of two experienced pharmaceutical executives who were frustrated by the relatively low efficacy of prescription drugs in treating mild to moderate chronic illnesses. Due to the pressures of managed care, plus the onslaught of

pharmaceutical direct-to-consumer marketing, physicians often found themselves with a lack of timely access to new information about drugs. Thus, they typically ended up prescribing one-size-fits-all drugs to patients based largely on pharmaceutical marketing prowess, rather than on safety and efficacy measures, which often indicated sizable placebo effects and non-response rates (i.e., the drug worked only as well as a sugar pill, and/or the actual drug did not consistently produced the intended effect).

Rather than be distressed by these findings, the founders of Opt-e-scrip sought a way to tap into its potential for customized medicine. "The truth is that the placebo effect is huge—anywhere between 35 and 75 percent of patients benefit from taking a dummy pill in studies of new drugs—so huge, in fact, that it should probably be put to conscious use in clinical practice, even if we do not entirely understand how it works" (Talbot, 2000, p. 34). This might also explain the reason why half of all Americans say they have tried alternative medical therapies, despite a distinct lack of empirical proof for their effectiveness.

"Over the past 30 years, the introduction of sophisticated new diagnostic and treatment techniques, equipment, and pharmaceuticals has seduced patients and providers alike into believing that 'more is better.' Decisions regarding the use of these technologies are often based upon patient demand, physician preference, or litigation concerns, rather than sound clinical research evidence" (Goldstein, 2000, p. 141).

Although many e-healthcare Web sites have chosen to jump on the bandwagon of patient empowerment, and thus feed the frenzy of discrepant information available, Opt-e-scrip determined early on to also empower physicians, who often need patient-specific data the most in making appropriate and timely treatment decisions.

“Physician use of researched best practices to make clinical decisions helps to educate patients about the appropriateness of diagnostic studies or medications they may think they need. The use of decision-support systems also protects the physician from litigation stemming from decisions not to offer expensive services, since that physician can demonstrate that her clinical decisions are consistent with state-of-the-art research” (Goldstein, 2000, p. 142). Thus, the Opt-e-scrip business model appears to have a chance of succeeding with both consumers and medical professionals in areas where the business models of other online pharmacies have failed.

#### The e-Healthcare Revolution: Empowered Patients and Customer-Focused e-Care

By all accounts, the e-healthcare revolution is sweeping the continuum of care. Thanks to rising demand for increased consumer control over their care and the desire of providers to take back control over their business, health care is becoming more automated, more streamlined, and more user-friendly (Marhula & Shannon, 2000, p. 8).

“Over 40 million American adults will use the Internet to purchase health and beauty products and more than 50 million will connect with health care professionals online within five years. Currently, about 34.7 million U.S. adults, or 48 percent of all those online, use the Internet to find health information” (Gallop-Goodman, 2000, p. 22).

This revolution is a particular boon to pharmaceutical manufacturers, who are using sophisticated branding and database-mining techniques to cultivate patient demand for their products. This effectively disintermediates managed care organizations, pharmacists, and physicians as the drivers in the traditional prescription process. “E-patients have tasted the power of disease-specific knowledge and have seen what will happen when they go to the physician and demand a product: they know they are likely to

get it" (Goldstein, 2000, p. 347). Goldstein adds that, as a result of such demand, many firms no longer maintain secure (e.g., password-protected) sites for physicians, feeling that it is inappropriate to keep information from the healthcare consumer.

Current estimates indicate that there are at least 20,000 health sites on the Internet. According to Eckstein (as cited in Washlick, Goettler, French, & Eckstein, 2000), this number could now be as high as 24,000; the Bischel (2000) CD-ROM contains more than 19,000 URLs alone. In addition, there are more than a dozen full-service online drugstores. According to Kantor (2000), "experts estimate that there are at least 200 such commercial online sites" (§1). The downside is that, according to Gómez Advisors senior healthcare analyst David Steele, M.D. (as cited in CyberAtlas, 2000), consumers are "overwhelmed with the abundance of information out there and inundated with e-health options" (§ 7). Rather than be exposed to glib brochureware and repurposed general healthcare information, Steele indicates that 41 percent of consumers polled wanted to be able to e-mail their own doctors. According to a recent survey, 78% of Family Safety & Health ("Web trends," 2000-01) readers would be interested in visiting an 'online doctor,' and the same percentage thinks that all hospitals/medical offices should offer Internet doctor services; 73% have used the Internet to find medical information or to answer health-related questions (p. 12).

Other site features important to consumers include the ability to obtain lab results online, plus convenient tools that allow consumers to verify health insurance eligibility and track reimbursements. Overall, 85% rated high credibility as the single most important attribute when selecting a health site, followed by convenience and interactivity (e.g., quizzes, assessments). On the other side of the equation, "applications regarded as



most important to medical-practitioner Internet activities include the implementation of online formularies, CME resources and access to medical reference libraries" (Jesitus, 2000, p. 12).

This preference—of "let me do" over "make me think"—is in line with both recent findings on overall Web usability and those that pertain specifically to healthcare patients. "Patients who are offered a method of participating in their own care tend to feel that they have a higher health-related quality of life and are more likely to comply with medical regimens and lifestyle modifications" (Goldstein, 2000, p. 363).

In discussing patient participation in his or her own care, however, a distinction needs to be made beyond whether content is active or passive. To be effective, content (information and functionality) should be specific to the individual, and qualified by the advice of a licensed medical professional. As Goldstein (2000) notes, "The delivery of on-line triage self-care services under the supervision of a doctor is very different than the delivery of self-care services with the 'entertainment' or media focus of the numerous general health Web portals populating the Net" (p. xxvi).

The combination of ever-increasing healthcare information overload and a backlash effect against "portal" sites cluttered with banner ads and essentially meaningless medical "advice" is expected to create favorable marketplace conditions for tailored healthcare services sites such as Opt-e-scrip. Supporting such initiatives in the marketplace are companies like Teltech/Sopheon, which "responds to unique inquiries with one-to-one access to experts. Knowledge is delivered just in time, not just in case" (Davis & Meyer, p. 200). As Jakob Nielsen (as cited in Rhodes, 1999) has said, "[Specialized] web sites are more important than larger sites in some very interesting ways. There will be experts

with web sites that fill very specialized niches, and these sites will be very valuable. They will have a core focus . . . the large sites can never match the robust nature of the smaller sites” (p. 6). Nielsen (as cited in Catapano, 2000) adds that “industry refusal to heed the calls of usability proponents directly affected the steep Internet market drop. Many of the recently dead dot-coms, he said—especially in e-commerce—made the fundamental mistake of drawing users to their sites with expensive promotions, then losing them forever with ineffective design or subpar services” (§ 20).

Nielsen (1997c) adds that “smaller companies will focus on specific competencies and increase their exposure to customers: by being small and having extensive external communications, the value of products and services increases relative to companies that make little use of networks and stay focused on internal politics” (§ 9). Cluetrain Manifesto co-author David Weinberger echoes this sentiment, noting that, “Once you realize that the web gives you a way to talk truthfully with other people, businesses that treat the web as another form of brochure or as broadcast medium seem completely clueless” [thanks to Web] ubiquity and the power of peer-to-peer interaction (Weinberger, 1999, as cited in Rhodes, 1999, p. 35).

Part of the reason for this continued oversight was touched on by Davison “Randy” Dulin (2000), president of HealthOnline.com, in his presentation to potential investors: “Drkoop, OnHealth, HealthGate, PlanetRx, Healinx, and Healtheon/WebMD . . . are much more interested in building their own brand image and re-intermediating the industry than they are interested in helping healthcare providers to gain the IT sophistication they need to transform from bricks and mortar to clicks and mortar” (slide 11). Nielsen (as cited in Quill, 2000) references this error also, saying that “brand loyalty

on the Internet is not about your logo or your image, it is purely about what you deliver to your customers every time they visit your site" (§ 17).

Goldstein (2000) identifies one of the reasons for generic information approach. "The web portals in 1999 tend to be text-based information warehouses that cannot even give medical advice or triage—it is too big a risk" (p. 85) and that "most of the 15,000 [sic] health and medical Web sites are forced, for legal reason [sic] and the lack of a doctor-patient relationship, to be an entertainment/education medium . . . Eighty-five percent of all health care dollars are spent on services, not pure information" (p. 264). Although health tips, support groups, and physician-finder services may give browsing/casual users a temporary sense of control, such offerings are either ignored completely, or looked upon as distractions, by more goal-directed, search-dominant Web users.

"Health information is insufficient to change consumer behavior. Focus all interventions on helping the consumer take action, whether that be changing a personal health behavior, purchasing appropriate care products, or scheduling appointments when they are needed" (Goldstein, 2000, p. 185).

#### Physicians Get On Line

The healthcare industry, and physicians in particular, are notorious laggards when it comes to embracing the latest technology. According to a recent report by New York-based Wit Capital (as cited in Darves, 1999) on the e-health industry, "only 2 to 3 percent of average healthcare organization revenues are spent on information technology, as compared to 8 to 10 percent for other information-intensive industries . . . the unique culture of health care . . . makes change, especially on the provider side, a slow, arduous

process”(¶ 7, ¶ 24-25; also see Datamonitor plc, 1999, p. 55). This finding is reiterated in several other sources. “Most medical offices have not kept pace with other industries in terms of purchasing technology, automating labor-intensive processes, and decreasing manual output” (C. Clark, 1995, as cited in Goldstein, 2000, p. 301).

Until recently, physicians had been very hesitant to provide advice to their patients online, either via a physician-practice Web site or e-mail. “In a 1998 study by Cyber Dialogue, 57% of physicians said that they believed that the Web can enhance physician-to-physician communication. But only 34% felt that way about physician-to-patient communication” (Miller & Brown, 1998, as cited in Goldstein, 2000, p. 301).

The latest findings, however, indicate that physicians may be coming around. Although more conservative than the Healtheon Corporation figures mentioned earlier, the Medem.com numbers, backed by organizations whose membership includes more than two-thirds of American physicians, may be more reliable. Findings from the fifth Medem Physicians’ Use of the Internet study (2000b), the largest study of physician use of the Internet to date, show “200 percent growth in physician use of e-mail with patients in less than one year. Ten percent of physicians are using e-mail daily or weekly to communicate with their patients. Half of all physicians who responded are using the Internet in their offices daily, up from 37 percent less than a year ago. Over 75 percent view a physician- practice Web site to be a valuable tool for patient education” (¶ 1-2, ¶ 4). Professional medical sites have the opportunity to provide comprehensive, actionable, information at the point of decision-making, which should help improve the quality and efficiency of medical-care delivery.

In the more recent October 2000 Medem survey of over 700 physicians, half said they would be more interested in using e-mail to communicate with patients if they were reimbursed for it, and if a clear office function is addressed or an increased office efficiency can be demonstrated. On the other hand, study results show that physicians seem to substantially underestimate how much their patients use the Internet, as well as patient interest in online communications with their own doctors. Nearly every national survey shows that the overwhelming majority of patients with Internet access would highly value online access to their physicians (Medem, 2000a, ¶ 2, ¶ 4).

Other study results are equally paradoxical. Although e-mail remains the primary reason that physicians use the Internet, just 10% of respondents communicate with patients using e-mail, perhaps due to current concerns about security and liability. Likewise, although 79% of respondents claim to have offices that are 'Internet enabled,' up 10% from 69% 6 months ago, more than half of physicians actively discourage Internet use in their office, due to fears of wasted time (Medem.com, 2000a).

As to what doctors are looking for on the Web, Liebman (2000) indicates that 85% of physicians who access the Web go to medical information sites. Professional association communications was cited by 57 percent of respondents, CME study by 52 percent, and diagnostic decision-making by 46 percent. According to a American Medical Association (AMA) survey (as cited in Liebman, 2000), the top three physician-visited sites are MEDLINE (19%), the AMA (16%), and Medscape (11%), followed by Physicians Online (8%), Amazon.com (6%), and National Library of Medicine, New England Journal of Medicine, and CNN (4% each; p. 97).

According to American Medical News (as cited in California HealthCare Foundation, 2001), 75% of physicians "personally use computers," up from 41% in 1999. However, only 54% of the surveyed physicians reported using the Internet at work. Another survey released last December by Deloitte Consulting and Cyber Dialogue (as cited in California HealthCare Foundation) supports these findings. While 90% of the 1,200 physicians surveyed had accessed the Internet in the previous 12 months, only 55% used it daily, and only 24% used it for professional reasons, including accessing online journals and consulting with colleagues. The latter numbers might be low because 80% of physicians did not view the Internet as "essential" to their practices as it did not increase revenue, decrease costs or improve care. However, 71% of physicians surveyed said that they expected to "rely" on the Internet more in 5 years, and 59% thought it would "radically improve" their communication with patients and health plans (§ 1).

In other words, although the success of non-physician healthcare executive business plans depends on doctors being online, physicians, who are currently not compensated for being online, do not believe the Web will make them more productive, and feel confident that they will keep their patients whether or not they are online. Doctors really care about the clinical domain, not the commercial one. Most business details are delegated to staff to save personal time and attention for medical issues. Physicians need to know for sure the Web can save them time, is low-cost or no cost, works as advertised, and bears a trusted quality stamp. By 2002, it is anticipated that physicians will find information easier to obtain online, and at least selected sites will have gained trust for quality. Hand-held communications devices may bring point-of care functionality, and physician-created electronic medical records may become practical,

evolving from the pricey acute-care setting and into the small- and medium-sized practice (Forrester Research study, 2000, as cited in Liebman, 2000, p. 98).

The implications of these findings for Opt-e-scrip are that encryption and liability waivers, as well as financial incentives, may be essential in obtaining physician compliance and in reshaping physician online habit patterns. Furthermore, the study results indicate an opportunity to present physicians with a set of tailorable “talking points” on the chronic conditions targeted by Opt-e-scrip, thus helping to overcome physician reticence at sounding unnecessarily unprofessional when pressed into service as content providers.

#### The Opt-e-scrip Concept: Less is More

The Opt-e-scrip operating concept dovetails well with the concepts of Web-site usability and simplicity already noted. Opt-e-scrip seeks to answer the usability question of “Why should I be here—and not somewhere else?” by providing medical information based on an individual-patient response to prescription drugs and/or placebos. The e-healthcare environment is ripe for a different approach than the customary trial-and-error gauntlet that chronic patients are asked to run. “Currently, there is great variability present in health care provided that does not appear to be related to changes in outcomes experienced in different patient populations” (Pryor, 2000, as cited in Goldstein, 2000, p. xvi).

The soundness of the Opt-e-scrip approach is corroborated in many other areas of the recent medical literature. “Healthcare marketers must move beyond cluster code market segmentation to reach real people rather than groups. They must respond to real

health needs and concerns to give each individual needed information at the most opportune time—for better health and lifetime relationships” (Paddison, 2000, p. 14)

Goldstein (2000) adds, “In order to affect large populations, health care systems must find cost-efficient ways to deliver behaviorally based disease management interventions to large populations, one person at a time” (p. 152). The proprietary Opt-e-scrip data base is based on this business model. Rather than proceed on pure inductive reasoning (general to specific), Opt-e-scrip enhances conventional treatment models and knowledge by applying randomized, controlled, limited-scope treatment tests to verify their efficacy on particular patients and their equally idiosyncratic bioavailability and circumstances.

“Once a population has been segmented according to risk, expected utilization, readiness to change, or any other factors, organizations can provide interventions targeted to fit that group. Tailoring takes this concept even further to create ‘segments of one,’ that is, designing interventions to fit each person’s unique set of characteristics and needs” (Goldstein, 2000, p. 159). This approach corresponds well to the Web, in that all Web users are unique, and all Web use is basically idiosyncratic . . . the right kind of question to ask is ‘Does this [feature], with these items and this wording in this context on this page create a good experience for most people who are likely to use this site?’ Nielsen (2000a) reiterates this notion, commenting that “the Internet revolution will drive custom-manufactured products, where each customer gets exactly the unique product” (§ 2) and “It is painful to use the Web, so we need to reward users: give them something new and better that they did not get before” (Nielsen, 1998a, ¶ 3). And yet, in a white paper written by the author 5 years ago, it was still observed that “90 percent of business



Web sites are not delivering content and services that meet their customers' requirements" (O'Hearn, 1996, p. 7).

As with the Opt-e-scrip business model, the Opt-e-scrip Web site can best answer the question above through testing, which "moves the discussion away from the realm of what is right or what is wrong and into the realm of what works or does not work" (Krug, 2000, p. 137), within the perspective of the Norman (2000, as cited in Nielsen, Tognazzini, Laurel, & Norman) "table of tradeoffs"—that is, user experience, marketing, manufacturing, engineering—supporting the product (p. 7).

Unlike many other e-healthcare Web sites now available, Opt-e-scrip effectively uses the local points of contact that patients are already familiar with and trust. "Health care is about service, not just information, and . . . most health and medical purchases are local. Patients want their own doctors—and they cannot generally access them on a national, commercial Web site" (Goldstein, 2000, p. xxii).

Rather than attempt to cobble together an end-to-end solution at the expense of site users, Opt-e-scrip intends to establish itself first as a value-added intermediary that increases the amount of productive interactivity and synergy that is possible among physicians, patients and managed care organizations. "In the case of on-line pharmacies, your organization can do better than the Web portals, since you are connected to the physicians who write the prescriptions" (Goldstein, 2000, p. 29).

As the Opt-e-scrip site continues to grow, and the average level of its user Web experience increases, Opt-e-scrip will have built a reliable base on which to add the applications that focus the most on the particular needs of the chronic-care community. Opt-e-scrip would accomplish this by inviting people in, providing a framework, giving

them resources, stepping back, and then allowing them to create a site that they want and need. "The number of on-line patient management applications for those with chronic disease [are increasing]; these applications allow better service and lower per unit costs than nurses connected by telephone in centralized medical call centers" (Goldstein, 2000, p. 2).

Eventually, technology may become ubiquitous and cost-effective enough to allow truly real-time analysis and reporting of  $N=1$  trial measures. Goldstein (2000), in noting that e-care delivery will be the dominant form of medical delivery by 2010, envisions a time when "those with chronic disease can perform their own daily e-checkup . . . and log it so physicians, nurses, and other providers can monitor care on line" (p. 29).

In having the Opt-e-scrip concept developed by actual pharmaceutical professionals, one Opt-e-scrip issue that might have slipped by its initial usability watchdogs was how to properly brand the Opt-e-scrip name. In their landmark book on Web branding, Ries and Ries (2000) note that names of Web sites stand alone, without the clues of the physical world. As such, they should be easy to spell and "speakable"; that is, not incorporating symbols, such as hyphens, that do not translate properly via word-of-mouth referrals, and not subject to alternate spellings due to the way its words are typically pronounced. Nielsen (1996) adds the admonition to "minimize the risk of typos by using short names with all lower-case characters and no special characters" (§ 7) and that "even when people have been to a site before, they will often try to guess or remember the site name instead of using a bookmark or history list: have memorable domain names that are easy to spell" (Nielsen, 1999e, ¶ 2).

Hyphens should be avoided because people often forget them, they can be mistaken for underscores, and they are rare (and thus a usability problem) . . . I would definitely advise anybody who starts a new company these days to pick a name that is available not simply as a trademark but also as an Internet domain. Having an obscure domain name is going to cost big time in lost customers. Good domain names that are easy to remember and easy to spell are the Internet equivalent of a Fifth Avenue real estate location in the physical world. (Nielsen, 2000b, pp. 246-247)

The Opt-e-scrip name was conceived with the idea of developing an entire line of related electronic-healthcare-optimization products (e.g., Opt-e-scrip, Opt-e-med, Opt-e-pop). From the user perspective, however, typing in the Web address of such products—a more common occurrence, given the increasing amount of pages that need to be indexed by search engines—is more likely to generate errors. The author registered the name Optescrip on November 25, 2000, without the hyphens, to make it easier for users to enter it into their browsers; however, the tendency to spell words phonetically may result in users looking for the site under the names “Optiscrip” or “Optiscript.” Recent developments in the expansion of available top-level domain names (e.g., .biz and .info) via The Internet Corporation for Assigned Names and Numbers (ICANN) and VeriSign Global Registry Services ([www.thedomainupdate.com](http://www.thedomainupdate.com), [www.networksolutions.com/np](http://www.networksolutions.com/np)) may offer more user-friendly alternatives in the future, as may the keywords being promoted by Web entities such as [realnames.com](http://realnames.com).

### Technology and Online Care Management

Even though e-healthcare, much like the Web itself, is still in its infancy relative to the conventional practice of medicine, a number of technological developments are on the horizon, and stand to increase both the user base and accessibility/ease-of-use considerably in the years to come.

For example, some managed care companies are using advanced technologies, including cellular telephones, to help members deal with a handful of costly ailments—including cardiovascular disease, diabetes and asthma—that generate disproportionate costs (Freudenheim, 2000, p. H14). Others are using interactive voice response, which has been shown to be useful in helping patients with hypertension and hypercholesterolemia comply with medical regimens and manage their conditions (Goldstein, 2000, p. 165).

Opt-e-scrip anticipates being able to use not only IVR, but also voice-recognition software now being marketed by Avaya, the company of a board member. In addition to making the Opt-e-scrip service easy to use, this software is considered as state-of-the-art security, identifying users by their unique voiceprints.

On the other hand, as was noted earlier by Nielsen (2000h), wireless application protocol (WAP) has had a host of usability problems from its inception. A user backlash should prompt simpler wireless screens geared more to that medium rather than repurposed from large-screen use. “Anytime, anywhere” medical advice (as well as education, directions, help, etc.) will come along someday on an information appliance, but probably unlike anything resembling a browser, such as WAP (Norman, 2000, as cited in Nielsen, Tognazzini, Laurel, & Norman, 2000, p. 46). The potential benefits,

however, are significant, in that “wireless satellite technology that links mobile communication devices to mainframe computers may allow instant data exchange independent of specific sites—an innovative approach for organizations that need to aggregate data collected over broad geographical areas” (Goldstein, 2000, p. 173).

For example, specialty pharmaceutical distributor Smartmeds.com is looking to adopt wireless connectivity via the Internet to offer tailored programs to managed care clients (Infu-Tech, Inc., 2000, ¶ 1). Also, since The National Pharmaceutical Council estimates that 90 percent of outpatients take their prescribed medications improperly or not at all, that 100 million prescriptions go unfilled in the United States each year, and that an estimated 125,000 Americans die each year from failure to take their medicine as prescribed, the effect of a real-time device monitoring drug compliance could be an extremely favorable development (Rosen, 2000, p. 24).

Opt-e-scrip will continue to track the information-technology marketplace for applications that expand its value proposition with the chronic-care community.

#### Pharmaceutical-Company DTC Advertising Onslaught

The low barrier of competitive entry on the Web can be a deceptively enticing proposition. “Small businesses have the same opportunities to market themselves on the Web as large companies, especially because the cost of producing a Web site is miniscule as compared to TV or radio advertising” (Noel, 2000, p. 8). Even so, the numbers of the larger players are staggering. The David-and-Goliath challenge that Opt-e-scrip faces in attempting to rise above the pharmaceutical direct-to-consumer (DTC) advertising “noise level” is formidable indeed. “According to Jupiter Communications, on-line health and medical advertising will grow from \$12.3 million in 1997 to \$265 million by 2002, with

on-line DTC advertising representing 50 percent of the total" (eHealth, Inc., as cited in Goldstein, 2000, p. 17). Datamonitor (1999), however, projects this number to be considerably lower, at 30% (p. 84). To put this figure into further perspective, rival online drugstores, such as drugstore.com, PlanetRx.com, drkoop.com, and HealthCentral.com, were projected to have spent \$26 million to \$28 million on advertising and marketing in 2000 (Bransten, 1999, p. R42). Pfizer, the pharmaceutical company with \$17.5 billion in 1999 drug sales, a \$4.8 billion R&D pipeline in 2000, and the largest sales force in the industry (22,000), as of June 2000, had its detailing representatives make an average of 459 10-minute visits to doctors to persuade them to prescribe Pfizer drugs, nine of which hold the top sales spot in their therapeutic category, and eight of which have already generated \$1 billion in sales (Lee, 2000, p. 143). Compare this with online pharmacies overall, which, according to Datamonitor (1999), are projecting revenues of \$4.1 billion in 2003 and a 2.5% market share (p. 186), or \$966 million in spending and a 0.6% market share by Jupiter Communications (Kantor, 2000, ¶ 1).

To illustrate more completely the competitive picture, note that the "big pharmaceutical company" influence extends far beyond the Web and DTC advertising.

Meetings with pharmaceutical representatives were associated with requests for adding the drugs to the hospital formulary and changes in prescribing practice. Drug company-sponsored continuing medical education (CME) highlighted sponsor drug(s) compared with other CME programs. Attending sponsored CME events and accepting funding for travel or lodging for educational symposia were associated with increased prescription rates of sponsor medication. Attending

presentations given by pharmaceutical representative speakers was also associated with non-rational prescribing. (Ashley, 2000, p. 373)

According to Weissman (as cited in Goldstein, 2000), "Fully one-third of the 163 million adult Americans who have seen or heard a DTC television, print, or radio ad have spoken to their physicians about the medication" (p. 348). In other words, a cultural shift is underway: from patients passively listening to doctor recommendations, to bringing in Web-page printouts and asking about certain kinds of drugs and treatments, to telling or demanding that their doctors at least allow them to try a highly marketed drug, or else they will switch doctors, with the doctor rarely having enough time to research the complete treatment profile and characteristics of that drug.

Pharmaceutical consulting firm Scott-Levin (as cited in Goldstein, 2000) predicts that "DTC advertising will top \$5 billion in just two years, up over 1,000 percent. A significant portion of that will go toward Web-based advertising—reaching individual patients with specific diseases and generating the perceived need for certain drugs" (pp. 350-351).

Unlike some other types of Web-site users, these cyberchondriacs are not always as much of a moving target. According to a recent Lehman Brothers study (as cited in Liebman, 2000), "the average online health retriever is on a site for seven minutes" (p. 97), and Datamonitor (1999) notes that, since patients with chronic conditions will remain in the treatment pool far longer, they are more attractive targets for DTC marketing. About the only saving grace against this approach is that banner advertising on the Web is increasingly ignored, to the point that any legitimate content appearing to be a banner ad is dismissed unread just as easily. "The painful truth is that most users do

not care about your deals because it is obvious to them that the deals are almost always driven by business objectives, not user needs" (Krug, 2000, p. 119). These needs include education and learning, entertainment, family, health, religion, self-fulfillment (personal satisfaction and worth), sex, social interaction, and work.

Nielsen (1998b) adds: "Ultimately, those who pay for something control it. Currently, most Web sites that do not sell things are funded by advertising. Thus, they will be controlled by advertisers and will become less and less useful to the users. A veritable arms race has already started, with more and more annoying advertisements that intrude on user attention in an attempt to survive ever-declining click-through rates" (§ 1).

According to a January 1999 audience loyalty survey conducted by Forrester Research's Media Field Study unit (as cited in King, 1999), "frequently updated, high-quality content that displays quickly and is easy to use are the main factors that retain your Web audience . . . branding, old media advertising, and banner ads are less effective in gathering an audience than search engines, e-mail, Web site links, and word of mouth" (§ 1). This study further reveals that "users return to their favorite sites for the strong content (75%) and regular turnover of information (54%). Snappy design that loads quickly (58%) and is easy to use (66%) are two other important factors" (§ 6). The authors of The Cluetrain Manifesto<sup>1</sup> add that "no number of ads will undo the words of the market" (Levine, Locke, Searls, & Weinberger, 2000, p. 92). Although pharmaceutical companies often can spend their way into share of market, Internet start-ups cannot, and so need to capitalize on every chance to compete on a more level playing

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<sup>1</sup> The Cluetrain Manifesto ([www.cluetrain.com](http://www.cluetrain.com)) is a book that tells business to cope with Web culture.



field like the Internet. "Internet start-ups typically spend 300 times as much money on advertising as they spend on usability. As a result, many of these new sites will fail to keep their users and will not grow into long-term successes. Venture capitalists should question the budget allocation of their portfolio companies and refuse to waste money on sites that do not have a thorough usability process in place" (Nielsen, 1999f, ¶ 12).

Even so, the unchecked marketing largesse from and increasing competitive pressures among these pharmaceutical companies is a daunting prospect, especially when one considers the amount of data they have already amassed on prescription drug users and their conditions. "The Internet has now extended the reach of the pharmaceutical companies to the point where they can circumvent the formulary restrictions of managed care. Using Web-enabled technologies, pharmaceutical companies directly reach, teach, and influence the physicians that managed care hoped to isolate. And they promote the products that the managed care organizations hoped to eliminate" (Goldstein, 2000, p. 366).

Opt-e-scrip believes that a backlash effect is coming, and that as e-healthcare users increase their level of Web sophistication, they will become increasingly intolerant of having brands thrust at them without a clear indication of how usage of such a brand will affect them personally. Users will demand to know how long they are expected to stay on a drug before they see unmistakably positive, consistent and lasting results, without any harsh corresponding side effects or major lifestyle restrictions. The advocate and anti-establishment nature of Web culture may create an opportunity for companies like Opt-e-scrip, which bases its entire business model around particular user needs (i.e., selling benefits such as solutions, experiences, simplicity, and value-added services, and not

merely “ingredients” or features), and not whether a patent is going to expire shortly on a drug with a historically high markup (Hall, 2001).

Although a natural synergy exists with managed care organizations and pharmacy benefit managers as possible partners or investors, the downside risk is that “patient distrust of any plan-sponsored initiative is regarded as the primary obstacle Opt-e-scrip will need to overcome in building a franchise. Patients will be unlikely to cooperate if they believe the system is designed to provide the MCO with information that could be used to deny them access to certain therapies on the basis of cost considerations” (Huser & Reitberg, 2000, pp. 7-8).

The sensitivities involved, while not insurmountable, are based on years of user real-life negotiations, at considerable disadvantage, with MCOs. “According to a 1997 study by the Kaiser Family Foundation and Harvard University, 61 percent of consumers in heavily restricted health plans feel their managed care organization is more interested in the bottom line than in quality health care” (Hoff & Hoff, as cited in Goldstein, 2000, p. 358).

The other possible prompt for a user backlash is that, especially regarding chronic conditions, users are not being made privy to anything other than legally required information about their prescriptions, with descriptions of their conditions frequently left to their imagination—which makes it very hard for them to know when they can safely disembark their personal prescription “merry-go-round.”

“When selling a product for depression or cholesterol, it is not just the pill that is being offered: the condition is being addressed as well. And here, the manufacturers are not doing so well. According to the Journal of Managed Care Pharmacy

(www.amcp.org), 28 percent of people do not know the indications for depression. For high cholesterol, 79 percent of people do not know the indications, and for migraine, 59 percent do not" (Bloom, 1999, ¶ 5).

Research reported in Prevention magazine confirms these conclusions. In the July 1998 Survey of Consumer Reactions to Direct-to-Consumer (DTC) Advertising (as cited in Weissman, 1998), "only 21 percent of consumers who saw the DTC ads think they are very clear. Indeed, many viewers who saw an ad for a brand-name drug later said they did not know what the drug was for—even if they themselves had the symptoms described in the ad" (p. 28).

The Acuity HealthGroup of advertising conglomerate Omnicom Group (as cited in Weissman, 1998) cited a 1998 survey by VHA, a nonprofit healthcare membership organization, and Deloitte & Touche, which indicated that 25 percent of consumers changed physicians within the last 2 years. "Since patients may no longer enjoy the luxury of maintaining a long-term relationship with their primary-care physicians, drug companies have the chance to step into the breach, exploiting their own staying power by devising mini-health plans that cater to individual healthcare needs. And the breach is a lucrative place to be, because 80 percent of all medications sold are for long-term conditions" (p. 29). It is precisely this window of opportunity that Opt-e-scrip hopes to reach first, by nimbly slipping under the radar screen of the pharmaceutical-marketing behemoths and establishing its credentials for presenting an integrated, tailored healthcare solution that produces measurable results for chronic-care patients.

### Confidentiality and Privacy Concerns

One of the major impediments to widespread acceptance and use of e-healthcare that everyone can agree on is Web-site security as it relates to confidentiality and privacy, and indirectly (and perhaps, more importantly), to trust and credibility. To gain credibility with users, it is essential to "specify precisely what you will do with any sensitive data you ask for" (Nielsen, 2000b, p. 92).

According to the Pew Internet and American Life Project, 89% of health seekers are concerned that a health-related Web site might sell or give away information about what they did online; 71% are very concerned—and yet just 24 percent of health seekers have clicked on a health or medical Web site privacy policy to read about how the site uses personal information (Fox & Rainie, 2000, pp. 5, 15). These numbers are relatively consistent with other sources. "Sixty-six percent of Internet health-information seekers say they are 'concerned' or 'very concerned' about personal privacy" (Datamonitor plc, 1999, p. 60). Likewise, Gómez (as cited in CyberAtlas, 2000) found that "61% of consumers indicated they are hesitant to provide their health information over the Internet out of fear that others will gain unauthorized access" (§ 11).

The picture painted by recent Jupiter and Cyber Dialogue research (as cited in "Lack of consumer trust," 2000) is even more foreboding.

A Jupiter Consumer survey found that less than 20 percent of consumers indicated an interest in sharing any personal information with pharmaceutical sites . . . [and] according to the Cyber Dialogue report 'Consumer Privacy in Online Healthcare,' among the 37 million online users who do not currently use online health information, 6.3 million are not doing so primarily because of privacy and security

concerns . . . Online health consumers are most likely to trust their physicians, medical institutes, and associations to maintain the privacy of their personal health information. They are least likely to trust pharmaceutical companies, Web portals, and online drugstores, according to Cyber Dialogue. (¶ 4, ¶ 6, ¶ 7)

Although 26 percent of healthcare Web site users say they are very satisfied with the current information available on the Internet, many more are satisfied with information they receive from doctors (64 percent), medical journals (51 percent) and friends (36 percent), because most healthcare Web sites are not personalized ("Healthcare sites should tailor," 2000, ¶ 1).

This research is confirmed by Marhula and Shannon (2000), who note that:

Patients are, by and large, looking for healthcare content customized to their healthcare needs . . . they are looking for better ways to manage their own care . . . the most trusted source for people online are their own doctors—followed by national health experts and local hospitals. Dead last in the list are media companies and Internet companies . . . it is not the information itself that is driving value in the industry. Rather, it is what people are doing (or expecting to be done) with this information (pp. 26, 36).

The main areas of concern to Web users are notice (how their information will be used), choice (can they decide what is used for specific purposes), access (will they have an opportunity to review/correct), and security. These are valid concerns, confirmed in the Federal Trade Commission June 1998 Report to Congress (as cited in Kane & McEahern, 2000), "Privacy Online," which surveyed 1,400 Web sites: "The Commission survey shows that more than 85% of Web sites collect personal information from

consumers. Only 14% provide any notice with respect to their information practices, and just 2% provide notice by means of a comprehensive privacy policy” (pp. 4-5).

These findings and others (e.g., see <http://www.healthprivacy.org>) indicate that sites should post a policy, say what they do not do, close any policy loopholes, define affiliates, use an opt-in rather than an opt-out approach (see Appendix A), define user consent, avoid vague language, and also address cookies and security measures.

To offset the effects of the negative perceptions noted above, more e-healthcare companies are putting clear, prominent assurances of site security on their home pages, and/or establishing extranet sites, where entry is password-protected. “In January, Aetna U.S. Healthcare will begin providing information from Harvard Medical School to members of its open-access health plan. Members would have a ‘password-protected home page’ where they could check on claims and sign up for help with chronic illnesses” (Freudenheim, 2000, p. H14). The New York Times (as cited in Nagourney, 2000) further reports that “The A.M.A. is also working with Intel to create a secure-identification system for doctors and the people they communicate with, like pharmacists” (p. H16).

Self-legislation efforts began in November 1999, with the creation of the Hi-Ethics (Health Internet Ethics) Alliance, a coalition of 20 e-healthcare sites that pledged an ethical code of conduct to consumers, and developed standards designed to ensure that consumers are provided with health information that is reliable, safe and trustworthy (HealthGate Data Corporation, 1999, ¶ 1).

And yet, in January 2000, many of these same Web sites were excoriated in a study conducted by the California HealthCare Foundation (Goldman et al., 2000), which noted,

among other things, that “we found third-party ad networks receiving access to information that would allow them to build detailed, personally identified profiles of individual health conditions and patterns of Internet use” (p. 34). Business Week (2000) cites a recent article, which notes that, “for about 9¢, some medical data sites will sell you your neighbor’s history of urinary tract infections” (§ 2). A Georgetown University study (as cited in Business Week, 2000) of the privacy policies on healthcare sites showed how common sharing of information has become. Of 21 sites sampled, 6 offered assessments on health conditions that were actually run by other companies. Some companies shared names, ages, and e-mail addresses, which makes it hard for users to know who has their personal data, or which privacy policy to rely on.

In March 2000, a bill was proposed in Congress (H.R. 4059, the Online Privacy and Disclosure Act) in which E-commerce companies will adopt internationally recognized principles concerning the collection, use, and dissemination of personal information. The companies that follow these guidelines will be allowed to display a uniform seal administered by the Federal Trade Commission (American Teleservices Association, 2000, § 1).

The standard would be far stricter than those currently guaranteed by the three leading online seal programs, Secure Assure (168 members), BBBOnline (260 members), and TRUSTe (the latter claims 1,300 companies as members, making it the most-displayed ad or promotional banner in the country). Even so, in February 2000, a healthcare trade group revealed breaches in the stated privacy policies of 16 healthcare Web sites, including six TRUSTe members. Among other things, the sites were criticized for failing to disclose that ad-banner networks they participate in, such as

DoubleClick, let advertisers collect any personal information that a customer enters on a page where an ad appears (Rafter, 2000, p. 187). More particular to healthcare, the Health on the Net logo (see <http://www.hon.ch/home.html>) is meant to indicate that a site prescribes to a code of ethics outlined by the Health on the Net Foundation. Lastly, the National Association of Boards of Pharmacy (<http://www.nabp.net>) certifies Verified Internet Pharmacy Practice Sites™ (VIPPS™), to assure consumers that the prescription medicines they receive are from legitimate online pharmacies.

Another piece of legislation, the Internet Prescription Drug Consumer Protection Act, is supported by the National Association of Attorneys General, the American Pharmaceutical Association, the American Society of Health-System Pharmacists, the National Consumer League, and Drugstore.com.

The legislation that has caused the greatest concern, however, is the Health Insurance Portability and Accountability Act (HIPAA) of 1996. HIPAA acknowledged the need for minimum national health care privacy standards to protect against inappropriate use of individually identifiable health information, given the increased usage and access to electronic media (Gellman, 2001; Washlick, 2000).

Consultants are already predicting that the expenses and time necessary to conform with HIPAA regulations, when final, will dwarf Y2K compliance efforts . . . A 'covered entity' (including pharmacies and healthcare providers who transmit health information in electronic form) may use protected health information that has been 'de-identified' by removing, coding, encrypting, or otherwise eliminating or concealing individual-identifying information. Protected health information cannot be used without patient authorization. Compliance is required by December



28, 2002, twenty-four months after the effective date of the final regulations.

(Washlick, Goettler, French, & Eckstein, 2000)

As another alternative, the World Wide Web Consortium has released its Platform for Privacy Preferences (P3P) standard. P3P offers a technological alternative to having consumers read the privacy policy at each Web site. A user browser would automatically “read” the Web site privacy policy, to see whether the Web site meets user preferences for whether personal data can be shared with other sites. If a site shares data in ways that go beyond user preferences, then the user gets to decide whether to proceed with browsing at that site.

Legislation and self-regulation aside, the state of Web-security technology is changing almost daily. At its simplest level, security-conscious users can be given an option for changing their own password, which would only be known to them. VeriSign Secure Site 128-bit encryption (<http://www.verisign.com/server/rsc/gd/secure-bus>), the most advanced encoding available today, and, according to them, the number-one trusted brand on the Internet, is another way to protect sensitive data. “If log-in is needed, use the standard HTTP authentication mechanism rather than your own log-in screen: in many cases, users will then be able to have the browser remember the user ID and password for them. Usability studies show that users almost never remember their passwords, so they typically write them down anyway” (Nielsen, 1997b, ¶ 13).

To get around the traditional logon/password method of authenticating users entirely, Microsoft Smart Cards® could also be used. Another option is virtual or value-added (private) networks, which are regarded by many healthcare providers as being more secure, more reliable and faster than the Internet (Datamonitor plc, 1999).

Looking into the future, a peer-to-peer (P2P) computing architecture such as Groove Networks could provide communication among individuals via the Internet without the need for a central server. This decentralized approach to computing:

gives individuals the control, security and privacy they require, and enables closely-knit groups to collaborate on a broad range of activities within secure, shared virtual spaces, in real-time, or at different times. Groove fully encrypts all content, both on user PCs and across the network, ensuring confidentiality of all communications. With Groove, each computer is its own server. After an initial sign-on, the machines all talk directly to each other. This makes running a Groove 'shared space' much simpler than the usual server-based rigmarole. (Groove Networks, 2000, ¶ 1)

Technological gadgetry aside, security—a familiar, feel-at-ease, comfortable, non-threatening environment with no undue surprises—is one of the unheralded, yet key criteria in the online buying decision, along with quick and easy navigation, selection, and price. And yet, the typical Web user too often finds oneself in an ambiguous twilight zone, intimidated, and proceeding tentatively. As Norman (as cited in Nielsen et al., 2000) says, the battleground of trust involves balancing privacy and truly personal interaction on one side, and convenience, time savings, externally added value, and the need for community on the other: depending on the user, this can be either liberating or tyrannizing (p. 48).

"Seal of approval" logos can be included on Web sites, but these alone cannot be relied on to establish trust, as many Web users still do not know at first glance what such

symbols mean. Links that make it easy for Web customers to check site trustworthiness are at least as valuable, as of this writing (Nielsen, Molich, Snyder, & Farrell, 2000, p. 1).

Nielsen (as cited in Hamilton, 2000b), in his critique of another healthcare site, comments that "anybody who wants to get people to answer highly personal health questions needs to establish credibility to a much greater extent than somebody who simply wants \$20 in return for shipping you a book" (§ 10). Putting himself in the users' shoes, Nielsen notes that unexplained requests for information, especially the dreaded registration page, act as disincentives to engage in the process at all, whereas allowing users to remain anonymous until they have established a commitment to the site is appreciated. He also suggests adding more prominent privacy explanations to the home page, plus an explanation of the site business model in terms that make it clear to users how the site can make money without cheating them (e.g., offering general content for free, while charging for more specific, targeted content and access to archives and libraries). Credibility is also enhanced by rewriting any user agreements or other jargon in plain language.

Opt-e-scrip intends to keep a close watch on developments in this area, adding any that make sense in addition to its own proprietary security measures, such as the voice-recognition software already mentioned.

#### Summary/Future Predictions

In the still young and ever-expanding world of e-healthcare, it is frequently noted that by the time findings are reported in a conventional information-delivery medium, the entire landscape has re-invented itself, and assumptions that appeared promising on the

drawing board come crumbling down when the surprises of usability testing and the vagaries of investment capital become evident.

Caveats aside, some interesting patterns hold additional promise for the Opt-e-scrip concept and business model. One such area is alternative medicine: Opt-e-scrip could either attempt to siphon off patients that pursued alternative care simply because there was not an intermediate option between it and conventional prescription drug use, or incorporate alternative medicine as a now-accepted means of accomplishing the same end result; that is, testing the placebo effect with what are frequently inert substances, but with the cache of the kahuna or “medicine man”/shaman to encourage favorable outcomes. An added benefit would be the potential savings and/or increased value added that could be derived in comparison with the considerably higher current profit margins of alternative medicine. “The vitamin and nutritional supplement market is particularly attractive to online pharmacies because the product margins can be as much as three times higher than other pharmaceutical products” (Datamonitor plc, 1999, p. 193).

One of the primary complementary and alternative medicine (CAM) demand drivers is widespread consumer dissatisfaction with conventional medicine and its inability to treat chronic illness. Treatment success for [chronic] conditions such as arthritis, asthma, and chronic fatigue syndrome—for which conventional medicine offers little relief—is often achieved using CAM therapies, more cost-effectively, and with fewer side effects. (Goldstein, 2000, p. 100)

As noted previously, Opt-e-scrip Phase II information could include more sensitive and complex transactions related to reimbursement, such as conveyance of test-kit prescriptions and patient insurance-coverage information and/or payment, as well as real-

time delivery of patient quality-of-life questionnaires and treatment profiles/reports.

Another possibility is that Opt-e-scrip will be uniquely positioned to provide faster, more accurate reporting of adverse drug events for new drugs, perhaps offering this technology to the Food & Drug Administration (FDA) for use in its Sentinel Sites Surveillance Program. According to the Cerner 1998 annual report (as cited in Datamonitor plc, 1999), adverse drug reactions kill about 100,000 hospitalized patients in the U.S. annually, not counting accidental overdoses; another 2.2 million experience serious nonfatal adverse reactions.

Many—perhaps most—adverse drug reactions are due to the fact that the drugs are developed and prescribed in a one-size-fits-all way, metabolically speaking, as if our bodies were not as wildly different on the inside as they are on the outside . . . do not expect the one-size-fits-all paradigm to fade quickly . . . a massive tug of war is shaping up over personalized medicine, and how it plays out will have profound effects on health care for the rest of our lives . . . By 2010, it is possible that ‘personalized’ drugs tailored to our genetic idiosyncrasies or ‘genotypes’ will start arriving in pharmacies, along with tests to show who should get them. (Stipp, 2000, pp. 172, 173, 178)

In addition, Datamonitor estimates that “the Internet has the capability to reduce adverse drug costs by 60%” (Datamonitor plc, 1999, p. 49).

Other areas that will ultimately drive tremendous growth in online e-health transactions, and thus may be worth looking into, include such patient-facing processes as one-click e-mailing to a current physician, obtaining lab results online, health-insurance-

eligibility-verification tools, reimbursement-tracking tools, physician referral, call-center activities, patient registration/scheduling/education, and billing inquiry; plus such physician-facing processes as credentialing results, reporting charting/chart review, and care-path management/quality improvement.

In addition, it is hoped that online cross-promotion and education can eventually be used to somewhat decrease the staffing and selling costs of maintaining a detailing force, especially one that cannot easily compete with the sheer numbers and budgets of its counterparts on the pharmaceutical side. Opt-e-scrip could use the Web site as a real-time delivery vehicle of pertinent literature via posting of hyperlinked content files for download, as well as a place where users could sign up to attend special Opt-e-scrip specific events and seminars and/or receive an opt-in e-mail newsletter.

Other novel uses of the Web space include building up a list of affiliates, to make its visitors part of the family while letting them earn money by recommending the site to others. An infrastructure could be built to allow sites to start charging consumers for a page view after a certain amount of time has elapsed. Thus, consumers would not be charged for browsing, but would be charged small amounts when they stayed with content they liked.

XML, already in use for applications such as the P3P, will play a more substantial role, reducing or eliminating the need for a lot of intermediary functions. "In the future, increased use of XML will allow far more intelligent data interchange between sites and thus for more advanced value-added Web services" (Nielsen, 1998f, ¶ 10).

In the future, the site might also want to indicate to visitors quickly whether their particular health insurers have an agreement with Opt-e-scrip, to allow third-party

reimbursement for visitor prescriptions (Datamonitor plc, 1999). Maintaining personalized health histories, and sending e-mail reminders for prescription refills, are other ideas.

What the future ultimately comes down to, however—no matter what type of Web site is being built, and for what audience—is the survival of the easiest; that is, discover the three main reasons users come to your site and make these things extremely fast and obvious to do. A usable site is a tool that helps users achieve their goals in the simplest way possible, but ease of use is only a necessary, not a sufficient, condition of optimal Web site usability. The greatest contribution of usability comes before the design is even started, when you define what the system should do, what its features should be, and how user tasks should be supported (Nielsen & Tahir, 2000, ¶ 8).

The next chapter will explore how usability can be an essential part of the Web-design process in general, and of healthcare Web-services sites like Opt-e-scrip in particular.

## Chapter III

### WEB DESIGN, USABILITY AND OPT-E-SCRIP

#### Introduction: Why Web Usability?

Web usability matters, mainly because, unlike software, “users experience the usability of a site before they have committed to using it and before they have spent any money on potential purchases” (Nielsen, 2000b, p. 10). If the trial does not proceed seamlessly and effortlessly, there are millions of alternative sources (100 million Web sites by 2002; Nielsen, 2000b, p. 10) just a mouse-click away. Therefore, “the main goal of most Web projects should be to make it easy for customers to perform useful tasks” (Nielsen, 2000b, p. 11). When Nielsen and other usability experts say “easy,” they mean easier than anyone creating the Web pages thinks, as opposed to what these creators believe should be easy enough for users. After all, the two often come from completely different worlds, with a vast gap in Web-based experiences. Nielsen (2000b) adds that he expects the Web to mature in 2001, as “emphasis irrevocably changes from dazzling people with the novelty of a new medium to satisfying user needs” (pp. 4-5).

Although designing for this task seems daunting, users do have certain first-level needs that, if met, greatly increase the chances of a favorable, and importantly, a repeated, experience at a given site. When asked what factors are most important in helping them decide which online businesses to patronize regularly, more customers—54%—said the site had to be user-friendly and easy to navigate than any other factor, including good previous experiences (36%), fast response time (36%), relevant and updated content (27%), and bargain prices (15%; Cognitative Inc., as cited in Anders, 1999, p. R6).



In fact, usability expert Steve Krug's (2000) first law of usability is simply: Don't make the user think (guess, question, wonder, ponder). In other words, users should be able to "get it" at a glance—what it is and how to use it—because page elements are self-evident, obvious, self-explanatory. "Your job is to get rid of the question marks [that hover over users' heads when they come upon your site]" (p. 13). These confusion-inducers include names or terms that are cute or clever, marketing-induced, company-specific, and unfamiliar (too technical); links and buttons that are not obviously clickable; as well as artificially drawn distinctions. These should be replaced so that users can instead generate confident statements of being able to instantly identify various page elements (Krug, 2000).

"When we are using the Web, every question mark adds to our cognitive workload, distracting our attention from the task at hand" (Krug, 2000, p. 15)—and as these confidence-eroding distractions add up, the likelihood of bailouts via the "Back" button, or of jumping ship to other sites either bookmarked or simultaneously accessed by users (interlaced browsing), increases precipitously. The Back button accounts for somewhere between 30 and 40 percent of all Web clicks (Krug, 2000, p. 58). Since the Web as most of us know it has only been in existence about 7 years, the medium is still experiencing growing pains. According to Creative Good founder and president Mark Hurst (as cited in Rhodes, 1999), "39% of test users failed in their attempts to buy a product online, and 56% of their search attempts ended in failure . . . the online customer experience is broken . . . 75% of test users fail in their attempts to apply for a job online" (p. 39). Another respected Web author, Jared Spool (as cited in Rhodes, 1999), notes that, "We have yet to find a site where, if you choose questions at random based on information the

developers have placed on the site, users can find the answers more than 50% of the time (the best we have found is 42% of the time)" (p. 92). Nielsen (1998c), also referring to the Spool studies, notes that "on the average, the Web does not work: when you think of something to do on the Web, the expected outcome is that you will fail" (§ 1).

Why is the Web still so bad? Most usability experts agree that the reason is because Web sites are still designed more around the needs of their creators than of their users. "Very few companies have a deep understanding of how their customers do their jobs or use their products," said Paul Sonderregger (as cited in Gunn, 2000), an analyst with Forrester Research Inc. in Cambridge, Mass., and author of a December 1999 survey titled "Why Most B-To-B Sites Fail." Each of the Web sites encountered by Sonderregger shared a single flaw: "Not one based its content on rich knowledge about its users" (§ 2). In the same study (as cited in Gunn, 2000), it was noted that 87% of B-to-B sites do not provide relevant content at each decision point, and 63% are not organized around user goals. Only about a third of the 30 sites studied were easily found in top search portals. A big reason why they are not showing up is because "some sites forced visitors to click through more than seven levels of content to find relevant material"; 70% failed tests of value, ease and reliability (§ 2; also see: [www.forrester.com/ER/Research/Report/Excerpt/0,1338,8734,FF.html](http://www.forrester.com/ER/Research/Report/Excerpt/0,1338,8734,FF.html)).

Hurst and Gellady (1999) add that, unfortunately, many companies measure ease-of-use by their own standards [not the user's], and suggests that we "let [these companies] live in that 'house' for a while!" (i.e., be forced to accomplish tasks using their own Web sites; p. 8). To use another analogy, Weinberger (as cited in Rhodes, 1999) notes that usability fights the top-down 'we know best' tendency of most corporate cultures, and

suggests, "Never let somebody who has lived in a town all his life be in charge of the signs there" (pp. 35-36). Insiders think: How are we presenting ourselves? Outsiders think: How do I get the information? Talking about companies that use valuable Web space for promoting everything as opposed to informing users, Krug (2000) notes that "A shared resource (a 'commons') will inevitably be destroyed by overuse" (p. 118). "You need to show the Home page to people from outside your organization to tell you whether the design is getting this job done, because the 'main point' is the one thing nobody inside the organization will notice is missing" (Krug, 2000, p. 105). Lynch and Horton (1999) add that "most readers won't care how your company or department is organized and will be put off if such inside information is all your site appears to offer . . . make the items and services they want the most prominent items on the home page" (p. 23). Finally, Pearrow (2000) observes that "usability does not concern itself with arbitrary coercion of the users' path through your Web site. It ensures that regardless of how, when, or where your users enter your Web site, they will be able to use it" (p. 10).

To counteract this tendency for companies to create Web sites in their own corporate image, Hurst and Gellady (1999) advise that we:

draw heavily on objective, outside data . . . if outside resources are not involved, any development team will tend to design the experience for itself . . . In a recent study that asked managers about their site-design goals, ease-of-use was only mentioned by 36 percent, behind fast performance and consistent look and feel. Only 24 percent of managers said they measure ease-of-use by conducting user testing, while 28 percent made no attempt to measure ease-of-use at all. (p. 11)

Bill Jensen (2000), an expert in simplifying business processes, adds that:

Business is doing a horrendous job of organizing and delivering the raw material you need to make successful choices and decisions—relevant data, meaningful and usable information, easy-to-access knowledge—as well as a way to navigate through it all, ‘connecting the dots’ as you go . . . The more chaotic, new or interconnected change becomes, the more wayfinding—our ability to choose among choices—becomes a driving force . . . our ability to move information far exceeds our ability to make it useful. (pp. 3, 13, 20)

At the heart of good usability, then, is the notion of making the best choices and decisions possible immediately obvious for the user, without complicating those actions with content perceived as irrelevant or distracting (“noise”). To reiterate, the way to do this is to “place your customers’ needs at the center of your web strategy . . . [the site] should be structured to mirror the users’ tasks and their views of the information space” (Nielsen, 2000b, pp. 14-15; emphasis by the author).

To make a Web site as readily comprehensible as possible, Web-page information architects need to (a) create a clear visual hierarchy on each page; (b) take advantage of conventions (users’ expectations from their past Web-browsing experience, so they do not have to wonder why items are labeled with vague or mysterious names); (c) break pages up into clearly defined areas; (d) make it obvious what is clickable; and (e) minimize noise (Krug, 2000, p. 31). Pages with a clear visual hierarchy relate the importance of an item to its prominence on the page; any things that are related logically should be grouped or associated visually; and things should be “nested” visually to show what is a part (or subset) of what (Krug, 2000).

## Page Design

Page design on the Web consists of three components: aesthetic design (pleasing to the eye), information design (pleasing to the mind), and technical design (pleasing to our need to accomplish something for the amount of time expended).

Most page designs, however, have concentrated too heavily on the aesthetic component, often at the expense of the other two. "Despite good surface appearance, many sites do not come close to solving user problems: They do not have the information users need and they do not allow the transactions users want . . . the Web can be made at least 2000% more usable than it is now . . . Every time you iterate [i.e., fix the design flaws identified by your last test, develop the prototype further, and test again], usability increases by 38% on average" (Nielsen, 1998g, ¶ 1, ¶ 9).

Another common problem is that of poor information structure hiding behind a slew of so-so navigational options. "Dividing the page into clearly defined areas is important because it allows users to decide quickly which areas of the page to focus on and which areas they can safely ignore" (Krug, 2000, p. 37). "Navigation is a necessary evil that is not a goal in itself and should be minimized . . . users come to the site-screen 'real estate' for content, which should account for at least half of a page design, and preferably closer to 80 percent" (Nielsen, 2000b, pp. 18-22). The implication is that users should not have to figure out too much about how to navigate the site, over and above their immediate needs to locate the content they seek.

Bruce Tognazzini (as cited in Rhodes, 1999), a principal in the Nielsen Norman Group, and former lead designer at Healtheon/WebMD, notes, "The biggest problem with the web . . . is the invisible navigation. Users typically do not know where they are,

where they came from, or where they are going" (p. 105). "Nobody likes wandering from link to link with no idea what is where, or having to follow 10 links to find one piece of information" (Smith & Bebak, 1997, p. 286). "Every page needs to provide users with a sense of place and tell them where they have landed . . . Today, the dominating web user experience is that, on the average, you are on the wrong page" (Nielsen, 2000b, p. 260).

So what does good navigation "look like"? "Navigation helps us find whatever it is we are looking for, tells us where we are, gives us something to hold onto, tells us what is here, tells us how to use the site, and gives us confidence in the people who built it" (Krug, 2000, pp. 59-60). "Navigation that works should be easily learned, remain consistent, provide feedback, appear in context, offer alternatives, require an economy of action and time, provide clear visual messages, use clear and understandable labels, be appropriate to the site purpose, and support user goals and behaviors" (Fleming, 1998, pp. 13-14).

Navigation also needs to accommodate the needs of both directed searchers, who know what they are looking for, and browsers, who want to see an entire vista of possibilities and content interrelationships before identifying one as worth pursuing further. "If I am coming into a site and I know what I want, I should be able to find it easily. If I am coming in and I do not know what I want, clear choices, descriptions, and messages ought to be presented to me" (J. Hladacek, 1999, as cited in Burdman, 1999, p. 175).

Ideally, users will know to look in the same place for a set of standardized navigational options. So-called persistent (or global) navigation appears on every site

page but the home page, and includes a site ID, section/subsection headings, and utilities (e.g., a way home, a way to search, help, a site map, a shopping cart, about us/contact us).

It is dangerous, however, to assume that users are viewing the site in the same logical and familiar way as those involved in its creation. Krug (2000) describes the user reality as a "billboard going by at 60 miles per hour" (p. 21), in which the user looks around feverishly for anything that (a) is interesting, or vaguely resembles what he or she is looking for, and (b) is clickable. As soon as a halfway-decent match is found, click. If it does not pan out, click the Back button and try again (p. 21).

Some Web-site designers attempt to impose a standard on the maximum amounts of clicks or levels required to reach a given piece of information. While this is one consideration, it fails to account for the real reasons users give up, which is that of cumulative "question marks," or an overall time threshold for having to guess the right way to proceed. As Krug (2000) says, "It does not matter how many times I have to click, as long as each click is a mindless, unambiguous choice" (p. 41).

Some simple techniques for improving the navigational odds are to "put a logo (linked to the home page) on every page to provide context and navigation for users who have gone straight to an internal page" (Nielsen, 2000b, p. 27) and to "never use a fixed pixel-width for any tables, frames, or other design elements . . . specify layouts as percentages of the available space" to fit a wide variety of screen sizes (Nielsen, 2000b, p. 29). Also, since users so rarely find what they are looking for on the first try, it is always a good idea to place "related/in context" (associative) links in the upper part of a Web page, to allow for an easier "jumping-off" point "because users will often arrive at something that is approximately right, but not exactly right" (Nielsen, 2000b, p. 195).

None of these techniques matter, however, if the pages take too long to load, even if it means greatly reducing and simplifying the amount of visual “bells and whistles” on each page. “Simplicity should be the goal of page design. Users are rarely on a site to enjoy the design; instead, they prefer to focus on the content” (Nielsen, 2000b, p. 97). “Fast response times are the most important design criterion for web pages . . . get pages to users in no more than 10 seconds, because that is the limit of people’s ability to keep their attention focused while waiting” (Nielsen, 2000b, p. 42). Nielsen (2000b) notes that in 1999, the most widely used Internet sites, almost always a good barometer to follow, took an average of eight seconds to download (p. 46).

In the 9th WWW User Survey conducted by the Graphics, Visualization & Usability (GVU) Center (1998) at Georgia Institute of Technology’s College of Computing, “53% of respondents reported that they had left a web site while searching for product information simply because the site was too slow. The next most frequently cited problem on the web is a growing one—broken links” (§ 12). In the Nielsen (1998) revision of the Sun Web site, “[1,854] users thought that speed was more than three times as important as looks” (Nielsen, 1998e, § 8). This, however, is hardly a new issue. Vassos, alluding to the design vs. speed tradeoff in his landmark text of five years ago, notes that, “while the use of leading technologies are highly visible, in most cases their use adds very little to the site’s ability to meet corporate objectives . . . the business benefits of using these technologies have not yet materialized” (Vassos, 1996, p. 93). Likewise, O’Hearn (1996) noted that, “for the fourth year in a row, 70 percent of Internet users surveyed said that their most common problem was the slow speed of graphics pages via their Web browser” (p. 8).



To maintain user trust and credibility, assume that users expect one-second response times, which translates into five kilobytes (KB) on a 56 Kbps modem. Even though anything slower than this will pain some users, since all sites are painful these days, it is possible to have a Web page of 20-30 KB and be among the best sites on the Web in terms of response time (Nielsen, 1999b, ¶ 21). It is also a good idea to indicate the size of any downloadable items on the page, next to the link, if they are greater than 50 kilobytes. Holzschlag (2000) recommends using smaller, lower-quality versions of the images (thumbnails), and then linking them to the larger images, to give visitors the choice of seeing these or not, without incurring a download time penalty.

"The Web is an attention economy where the ultimate currency is the users' time . . . [as opposed to traditional media] the cost of going to a different website is very low, and yet the expected benefit of staying at the current site is not particularly high . . . Web content must give immediate benefit to the users or they will allocate their time to other sites" (Nielsen, 2000b, p. 160). "The digital economy covets attention more than goods and even money, because it has truly become scarce . . . the human capacity to pay attention is limited . . . and people are inundated with information . . . without customer attention, you lack relationship capital" (Tapscott, Ticoll, & Lowy, 2000, p. 202).

And yet there are instances, such as entertainment sites, in which graphics-rich sites make more sense. Gordon Paddison (as cited in Bransten, 1999) of New Line Entertainment said that his company's multimedia sites "generated 20% to 60% more traffic than static text-and-graphics Web pages, and the studio interactive banner ads, built with Java-produced advertising, got click-through rates of 8% to 18% [the most common clickthrough rate has been less than one percent]" (p. R58).

Another fundamental law of Web pages that is often broken is that of providing context, to orient users, and to create expectations as to the value of going to the other end of the link (also known as the rhetoric of departure, in hypertext theory). Web pages are often very poor at describing the options and making it clear to users where they should go to achieve what result. Rather than present information in a shroud of mystery and vague generalizations, because of the ever-ticking clock in users' heads, it is far better to be direct in outlining the options that are available, in a way that closely matches (i.e., is consistent with) what users expect and would predict. Spool, Scanlon, Schroeder, Snyder, and DeAngelo (1998) add that "the success of the link depends on how well users can predict where the link will lead, and how well the user can differentiate one link from other, nearby links" (p. 33).

Therefore, it is advisable to include additional (non-anchor) verbiage that explains the link—that is, a short textual summary; a publication date, if in a list—sufficient to decide what link to follow next (Nielsen, 2000b, p. 55). Links embedded in text are generally less effective than setting each link on its own line, with descriptive text appearing on a separate line.

This predictive equation is especially crucial because one unanswered question can kill the sale and/or end the visit. According to a recent cPulse advertisement (cPulse LLC, 2001), 80% of Web-site visitors never return to a site again. "The most fundamental reason to include outbound links on your site is that they form a value-added part of your content that comes very cheaply . . . it is so hard to track down useful information on the Internet, that users are going to love you for your [annotated] links" (Nielsen, 2000b, p. 70).

Minimizing variability allows users to adjust their behavior in optimizing their use of the system (Nielsen, 2000b, p. 44). "The time saved by using an optimal interaction technique is often smaller than the time wasted on having to think instead of just moving ahead with a single interaction technique that is always used" (Nielsen, 2000f, ¶ 12).

"Consistency is one of the most powerful usability principles: when things always behave the same, users do not have to worry about what will happen. Instead, they know what will happen based on earlier experience . . . The more user expectations prove right, the more they will feel in control of the system and the more they will like it. And the more the system breaks user expectations, the more they will feel insecure" (Nielsen, 1999d, ¶ 10- ¶ 11). "In usability, the fact that most other people do something is reason enough to follow along, because the most common practice is what users expect and find easiest to use" (Nielsen, 2000b, p. 246). "Users spend most of their time on other sites. This means that users prefer your site to work the same way as all the other sites they already know (Nielsen, 2000d, ¶ 7). Rosenfield corroborates this view: "The way we organize, label, and relate information influences the way people comprehend that information [and thus the process by which] people can find the right answers to their questions . . . consistency breeds familiarity, and familiarity breeds content(ment)" (Rosenfeld & Morville, 1998, pp. 22, 75). Krug (2000) adds that "conventions enable users to figure out a lot about a Web page, even if they cannot understand a word of it" (p. 35).

It should be noted, however, that some authors, such as Janal (2000), take some issue with the Nielsen contention that readers rarely read word-for-word without experiencing deleterious effects.

## Content Design

Janal (2000) notwithstanding, the most important aspects of content design are that text be concise, objective/neutral, immediately relevant, scannable, readable, understandable, winnowable, searchable, and fresh. In fact—more important than whether users can find the page they want, quickly (covered above)—the most important determinant of Web usability is quality content, not design, that answers the questions ‘What is in it for me?’ and ‘How does this help me solve my problem?’ (Nielsen, 2000b).

By scannable, the author means using highlighted keywords (hypertext links; also, typeface variations and color), meaningful sub-headings (not “clever” ones), bulleted/numbered lists, one idea per paragraph (additional ideas will be skipped if they are not caught by the first few words in the paragraph), and an inverted-pyramid writing style (start each page with the conclusion, so that the reader can stop at any time and still have read the most important pieces of information; Nielsen, 2000b, p. 112). Scientific writing, the basis for much of the Opt-e-scrip Web site, tends to do the opposite: “Do not make people wade through a bunch of background to eventually arrive at your point—most of them will never make it that far. In fact, this is one of the greatest challenges that Web sites about scientific or medical research projects face—scientists are trained to write white papers with methodologies up front, and conclusions in the end” (Gahran, 1999, as cited in Rhodes, 1999, p. 44).

Other devices that contribute to scannability include summaries, topic sentences, more links, bylines, cross-references, and half the word count (or less) than conventional writing (Nielsen, 1997a, ¶ 1-¶ 11). Krug (2000) is even more ambitious: “Get rid of half the words on each page, then get rid of half of what is left . . . this reduces the noise level

of the page; makes the useful content more prominent; and makes the pages shorter, allowing users to see more of each page at a glance without scrolling" (pp. 11, 45). It is also a good idea to use hypertext to split up long information into multiple "node" pages that each focus on a certain topic (Nielsen, 2000b).

Most Web sites today are also guilty of subjective, boastful, or exaggerated promotional "market-ese", which imposes a cognitive burden on users who have to spend resources on filtering out the hyperbole to get at the facts. Krug (2000) calls this "happy talk" (i.e., sociable, yet content-free brochure-speak), and notes that both it and instructions are rarely read, as they both tip the balance of need satisfaction away from the user and toward the Web-page creator (p. 45). Regarding instructions, Nielsen (2000b) has frequently commented that people do not read documentation voluntarily; however, step-by-step instructions are read more often than background information. Examples, overviews, flow charts, process diagrams, captions and hyperlinks to glossaries often prove as or more helpful (pp. 129, 131). "Faced with any sort of technology, very few people take the time to read instructions. Instead, we forge ahead and muddle through, making up our own vaguely plausible stories about what we are doing and why it works" (Krug, 2000, p. 26; also, see the definition of satisficing on p. 13).

To those design-oriented readers who claim that content is whatever is of most interest to the reader, and not necessarily text, Nielsen (2000e) cites an eye-tracking study:

Of users' first three eye-fixations on a page, only 22% were on graphics; 78% were on text. In general, users were first drawn to headlines, article summaries, and captions. They often did not look at the images at all until the second or third visit

to a page . . . the most common behavior is to hunt for information and be ruthless in ignoring details. But once the prey has been caught, users will sometimes dive in more deeply. Thus, Web content needs to support both aspects of information access: foraging and consumption. Text needs to be scannable, but it also needs to provide the answers users seek. (§ 4)

In glancing and scanning, “we tend to focus on words and phrases that seem to match (a) the task at hand, (b) our current and ongoing personal interests, and (c) the trigger words that are hardwired into our nervous systems, like ‘Free,’ ‘Sale,’ ‘Sex,’ and our own name” (Krug, 2000, p. 23).

In a nutshell: “If something requires a large investment of time—or looks like it will—it is less likely to be used” (Krug, 2000, p. 6). “We often find that roughly 20% of organization information is sufficient to meet 80% of user information needs” (Rosenfeld, 1999, as cited in Rhodes, 1999, p. 86).

Again, this is not a new development. O’Hearn (1996) suggested that site developers “restructure lengthy text paragraphs (now wider than the recommended three-inch Web eyespan) into sub-indexes and ‘text bites,’ hyperlinked to avoid the need for scrolling” and that “copy be redrafted to sound warmer and more conversational” (p.16).

Other areas in which content usability could be improved include hyperlinks, page titles, page names, headlines, diagrams, content freshness, and the size of button/menu text.

More specifically, within-page links (i.e., where, by clicking, one “jumps” to another part of the same page) should usually be avoided, because they clash with the user expectation of being taken to a separate page, which may disorient him or her. Page

titles (microcontent) should be like billboard slogans: information-carrying terms, such as names, that match up with user needs from the first word (Nielsen, 2000b, p. 123).

Page names should be: assigned to every page; in the right place, framing the content that is unique to the page; prominent (usually the largest text on the page); and match what the user clicks (Krug, 2000, pp. 72-73). Headlines are often used out of context and need to stand on their own (Nielsen, 2000b, p. 124). Diagrams should be clickable and simple. Also, "higher-level pages should minimize the number of illustrations because the user has not yet indicated a concrete interest in an individual object that needs to be depicted" (Nielsen, 2000b, p. 135). Content should be updated regularly; that is, users should not feel as if they go to the Web site of a Web-page creator more often than he or she does. Finally, "according to a recent audit of several websites, fully 76 percent had illegibly small text on buttons and menus" (Hurst & Gellady, 1999, p.10).

Other content-related ideas worth implementing include referral mechanisms (e.g., an "e-mail this story to a friend" button), and placing the most important links on the top screen, so no scrolling is needed, showing what choices are available. Users need to be able to directly compare everything (i.e., offer options, flexibility, and guidance), as well as what is not on the site, making the search/browse process as intuitive as possible, and in general, increasing or preserving user feelings of control, by trying not to put your interface in the way of their goal . . . The Web is a user-driven medium where users feel that they have to move around and click on things (information foraging; Nielsen, 2000b). "Most users are looking for information that fits with, or can be absorbed readily into, their existing worldview . . . use an organizational scheme that matches users' mental maps as closely as possible; information must be presented in such a way that it makes

intuitive sense to the user" (Conger & Mason, 1998, p. 29). After all, "he or she who clicks the mouse owns the Web" (Guglielmo, 2000, ¶ 5).

These ideas of choice and control are critical factors in content design. The goal is to approximate, as closely as possible, what an aggressively friendly, top-notch sales or customer service representative/ambassador would do in a store (Molich, 2000, p. 5). In addition to proactively offering search tips and tricks, and answering such user questions as "Can I help you find something?" "Did you find all that you were looking for?" and "Are you looking for anything else?" (i.e., an affiliate program for related purchases), this invisible assistant must interact with users to "winnow," or narrow down available choices and options, to an appropriate set of products; otherwise, the user tends to fault his or her own search strategy instead. "A site that does not help users narrow their attention on a few relevant products will be seen as confusing and not sufficiently helpful" (Nielsen, 2000b, p. 108). This is especially true since offline-business switching costs and differentiators—store location or hours; aesthetic "feel" inside a store; personal relationships; and to some extent, product selection and price—become irrelevant or commoditized online (Hurst & Gellady, 1999, p. 10). In order for winnowing tools to work, however, one must understand how one's users want to see subsets of one's product. Sort order, as with so many other items on the Web, needs to be obvious.

Ultimately, as Spool (as cited in Sims, 1999) says, the goal is to give the user every chance of picking up the "scent" (i.e., communication of confidence) that will lead him or her to her content "prey" (¶ 11).



## Site Design

In covering page and content design, it is important to realize that a site, to be successful, must be more than a one-page wonder (home page): it must help users get things done, and to do that, it must help users find things that fit with their expectations.

"People will not use your Web site if they cannot find their way around it" (Krug, 2000, p. 51), and yet, "Web usability suffers dramatically as soon as we take users off the home page and start them navigating or problem solving . . . [therefore] the main entry to the site should focus on what a user can do here and now" (Nielsen, 2000b, p. 164).

One of the best ways to do this is to ask and answer, ahead of time, the questions most users are likely to have when they first come across your site: "Where am I?" and "What does this site do [for me]?" [or "What can I do here?"] (Nielsen, 2000b, p. 166) or, according to Contentious Web-zine editor Amy Gahrn (1999, as cited in Rhodes, 1999), "Whose site is this? What kinds of information does this page contain? How much information is on this page? Whom is this information intended for?" (p. 43)

Steve Krug (2000) has his own version of this "battery of likely questions" approach, as does Fleming (see Appendix B). Since Web space differs from physical space, in that it offers no sense of scale, direction or location, Krug advocates what he calls the "trunk test" (i.e., as if you were thrown into a car trunk and taken for a ride, then abruptly dumped somewhere; to replicate this effect, one can instead simulate a fuzzy focus of a Web page; the intent is to pretend as if you were relying solely on the generalized or overall appearances of things, rather than the details). After having entered this role-play or scenario with a typically blurred view, one should get a sense for how users might answer the following questions without hesitation, upon arriving at any

page of a Web site: (a) Where am I/What site is this? (site identification), (b) What page am I on? (page name), (c) What are the most important things on this page/major sections of this site? ("signs" indicating sections and subsections, with brief descriptions or scope notes if needed), (d) Where should I begin/What are my options at this level? (local navigation), (e) Where am I in the scheme of things? ("You are here" indicators that highlight or mark the current location), and (f) Where did they put what I am looking for?/How can I search? (search function; Krug, 2000, pp. 17, 87-88). Nielsen (2000b) agrees: "Navigation must answer these three questions: Where am I? (relative to the Web as a whole, and also relative to the site structure; i.e., a "you-are-here" indicator), Where have I been?, and Where can I go?" (p. 188).

In addition, when entering a new-site home page for the first time, users should be able to answer four questions: (a) What is this [conveying the big picture]? (b) What do they have here? (c) What can I do here? and (d) Why should I be here—and not somewhere else? (Krug, 2000, p. 101). This is rarely an easy task, as the home page must convey the site identity and mission, its hierarchy of content and features (maximum of four), navigation and search functionality, content/feature promotions or "hooks," a clear starting point (for searching, browsing, sampling the best that the site has to offer, registering, and/or entering a step-by-step process), timely content, plus any deals, shortcuts (search box, table of contents, index, site map, pull-down menu, etc.) or registration gateways, all while establishing credibility and trust among a variety of visitors (Krug, 2000, pp. 97-98). The caveat about registration is that it rarely works as anything but an obstacle unless users are "asked for it after they have seen the feature

work, so they have some idea of what they were going to get in return (Krug, 2000, p. 120); Nielsen (1999h, ¶ 3) is of a similar mind.

Another helpful device, according to Krug (2000), is a good tagline—that is, one that is clear and informative, just long enough (six to eight words), conveys differentiation and a clear benefit, and is personable, lively and sometimes clever, as opposed to vague or generic-sounding. It can go a long way in focusing visitors' attention and in reinforcing their sense of confidence and trust in having come to the right place. Of particular importance to Opt-e-scrip, "sites that aim to create a new category must present a crystal-clear positioning statement on the home page that focuses on what users will gain from using the site and why they should care about it. You get two lines to explain your value proposition . . . sites need to work harder on making it clear why users should care when there are 10 million other sites to go to. What is in it for me?" (Nielsen, 1999f, ¶ 18).

Nielsen (2000b) adds that "a home page should offer three features: a directory of the site's main content areas (navigation), a summary of the most important news or promotions, and a search feature" (p. 168).

Ease of search and obtaining quick, relevant results are critical. Yet, at 68 percent of the sites tested by Paul Hagen (as cited in Babcock, 2000), a senior analyst at Forrester Research, fewer than half of the results had anything to do with the query, and nearly two-thirds of the sites failed to list the best results on the first page. Improvement will not come until Web operators critically review their own sites to see if the search functions are working. Effective search on a site enables customers to serve themselves, which

“costs 30 times less than phone calls and 10 times less than e-mails,” Hagen said (§ 44-45).

Three ways to make the search function more effective are keyword mapping, the use of an e-thesaurus (see Appendix A), and highlighting all occurrences of user search terms (Nielsen, 2000b, p. 238).

Slightly more than half of all users are search-dominant. These people are task-focused; they want to find specific information as fast as possible. Structure is either hierarchical or database-driven; and it is usually alphabetical, chronological, numerical (e.g., by price), or geographical, although sometimes, it is topical, task-oriented, audience-specific or metaphor-driven. About a fifth of users are link-dominant [i.e., follow promising links around a site], and the rest exhibit mixed behavior. (Nielsen, 2000b, p. 224; also see: Nielsen, 1997d, § 5)

Search, however, is much more than just appending a search engine to a Web site and then standing back to let the users in. It involves proper organization of information; choosing the right navigation schemes and systems; labeling items in ways that make sense to users; maintaining indexes, databases and site maps; checking user logs and soliciting user feedback to properly adjust and enhance search mechanisms; and much more.

“To meet user needs and demands, information sites must be faster, cleaner, better organized, more up-to-date, and more content-rich than any other type of site . . . successful sites balance ease of use and complexity, as well as incorporating ‘value-added’ features that help users not only find but interpret, store and share information (Fleming, 1998, p. 222).

“Label things clearly and make them obvious . . . You have to look at the architecture and the foundation structure of the blueprint before you decide what kind of wallpaper to put up” (Skeet, 1999, as cited in Rich, 1999, p. 235). Just as with text and design, the site structure must match the users’ mental models for how and where to proceed. “The two most important rules about site structure are to have one, and to make it reflect the user views of the site and its information and services [i.e., the tasks users want to perform there, preferably sortable and filterable, as opposed to a mirror of an organization structure] . . . user-centered architecture had about nine times as high usability as internally oriented information architecture” (Nielsen, 2000b, pp. 198, 202).

It is also important to make this user-centered structure obvious to the user, or else it will not serve its intended purpose as effectively. If possible, show all vertical levels of navigation, as well as alternate choices at one or more of the levels. Sites that require scrolling should put navigation bars at the top and bottom of Web pages. “A navigation interface needs to show all the available alternatives at the same time so that users can make an informed decision as to which option will satisfy their needs best” (Nielsen, 2000b, p. 196).

The two systems, browsing by menu and searching by keyword, complement each other—neither system alone is adequate . . . a well-organized table of contents or keyword index is an easy way to give readers a clear sense of the extent, organization, and context (narrative flow) of your site content . . . A Web site index should point to the most relevant and useful occurrences of a keyword and ignore minor references (these will turn up in a keyword search anyway). (Lynch & Horton, 1999, pp. 27, 47-48)

Several methods are available for reducing navigational clutter:

aggregation (showing a single unit that represents a collections of smaller ones), summarization (ways of representing a large amount of data by a smaller amount), filtering (eliminating entire wads of stuff we do not care about), truncation (cut off everything except the first initial parts of the information and let users click a "More . . ." for the rest; e.g., Yahoo.com), and example-based representations (show representative samples and say something like, '[number] more objects'; Nielsen, 2000b, p. 221).

A number of navigational schemes have come to predominate the most-visited Web sites: tabs (e.g. Amazon.com, Drugstore.com, ZDNet News), breadcrumbs (e.g., WebWord.com, LookSmart.com), rollovers, and pulldown menus. These trends are particularly important because "sites with high traffic score much higher in usability metrics than sites from equally famous companies with lower traffic" (Nielsen, 2000b, p. 390), and so can be instructive as examples for smaller sites such as Opt-e-scrip.

"Tabs are one of the very few cases where using a physical metaphor in a user interface actually works" (Krug, 2000, p. 79). Many large sites have started using tabs because they are self-evident, hard to miss, slick (visually interesting, yet compact and fast to load), and suggest a physical space (i.e., the visual cues of "things in front of other things"; Krug, 2000, p. 81). Tabs work best when they are drawn correctly (i.e., "pop" to the front), load fast, are color-coded, and a tab is selected when you enter the site; beyond a certain point, however, tabs do not scale as well as some other approaches (e.g., a menu down the side of the page; Krug, 2000).

Contrast this with Nielsen (1999i), who notes: "I maintain that tabs would be better used for switching between alternative (but related) views than for navigating to unrelated locations. But unfortunately, users will soon lose any understanding they may have had of tabs as a special design element if more and more sites keep abusing tabs" (§ 14).

"Breadcrumbs" (so named because, as in the fairy tale of Hansel and Gretel, they delineate a path where you have come from, so you know how to return; they are also known as recursive paths or directories) are "still the fastest way to navigate through levels of hierarchy" (Fleming, 1998, p. 220), and yet "breadcrumbs alone are [not] a good navigation scheme. They are not a good replacement for showing at least the top two layers of the hierarchy, because they do not reveal enough . . . [even though] they provide a convenient, consistent way to do two of the things you need to do most often: back up a level or go Home" (Krug, 2000, p. 77). Nielsen (2000b), who uses breadcrumbs on his own site, useit.com, notes that they are "useful only for hierarchical information architectures because they require nested levels of progressively smaller subsites" (p. 206). He adds that "a combined breadth-depth display (e.g., LookSmart.com) is probably more suited for . . . Dynamic HTML, [which] can be used to combine permanent visibility of all the levels (depth) with a temporary pop-up of the alternatives (breadth) on any given level when the pointer is over the name of that level" (p. 207).

Rollover graphics "change when the end-user mouse goes over them, and are great for adding visual cues that ensure your audience knows an image has special meaning (e.g., as a link), as well as a space-saver, because you can put extra information within the changing graphic (Weinman & Green, 2000, p. 352). Often, menus pop up when a cursor is placed or "rolls" over a visual. The trouble with rollovers, however, is that you have to

seek them out, you can only see one at a time, they are twitchy (the text comes and goes quickly), and they are ineffective unless the popup appears near where you are pointing (Krug, 2000, p. 113). Nielsen (as cited in Hamilton, 2000a) not so affectionately refers to them as “scratch-n-sniff” and believes it infuriates impatient Web browsers and will chase them away (§ 14).

Pulldown, scrolling, or “jump” menus have similar problems in exposing the site content and in twitchiness, and they are also hard to scan. They are most effective for alphabetized lists of items with known names (Krug, 2000, p. 115). However, they “reduce usability when they prevent users from seeing all their options in a single glance” (Nielsen, 2000c, ¶1, ¶ 13-16) and should be avoided for interacting menus (wherein the options in one menu change when users select something in another menu on the same page), very long menus, menus of state abbreviations, such as for U.S. mailing addresses, and menus of data well known to users, such as the month and year of their birth.

Other items that often can be beneficial in site design include noting the person responsible for this page, when it was last updated, confidentiality/security policies, and site news items. In addition, a demo area with generic data and a simple password given out freely to all prospects can be used to show how an extranet, if one is included, might be used for new projects (Nielsen, 2000b).

#### Conclusion: Simplicity in Web Design

With 200 million sites, 500 million people online, and 50 billion pages expected by 2005 (Nielsen, 2000b, p. 347), the need for simplicity amidst a crush of information from a wider variety of sources is paramount.



Perhaps the best definition of simplicity, as with Opt-e-scrip, is being able to provide first what users need the most: a HOME RUN (e.g., High-quality content—not reduced to a commodity; Often updated; Minimal download time; Ease of use [better: Joy of use]; Relevant to user needs; Unique to the online medium; and backed by a Net-centric corporate culture (Nielsen, 2000b, pp. 380, 382). If this is done properly, then, as with permission marketing, the site will have earned at least one more return visit (which is more than most sites get), plus the possibility of both broad and deep word-of-mouth, usually via e-mail.

Conversely, simplicity implies also knowing what not to do, as users, already in the habit of rushing through a series of substandard pages to accrue parts of the solutions they seek, will view any extraneous information as the equivalent of speed bumps, tollbooths and other dubious trappings of the cyberhighway. “The guiding principle for web design must be to get out of the way and make users successful as fast as possible . . . Websites should make the main things users want to do very simple” (Nielsen, 2000b, p. 380); that is, make it easy, pleasant, and efficient to buy.

Putting up a Web site that gets users to stop by once is not enough, as, due to the vagaries of the Web, almost anyone can come crashing through the door by accident or simple curiosity rather than by intention. “The only real success criterion for a website is repeat traffic from loyal users . . . Usability comes first even if a site is not trying to sell anything. Loyal users are the only true value on the Internet, and users do not return to sites that are too difficult to use” (Nielsen, 2000b, pp. 380, 389).

Repeat traffic also matters because the results of online transactions can be multiplied easily and rapidly. “When a customer has a bad experience on a web site, on

average, they tell about 10 other people. An e-business may lose the lifetime value of several customers by providing one bad experience . . . [on the other hand] 53% of total online revenues come from repeat customers" (Hurst & Gellady, 1999, pp. 3-4).

Since loyalty is still a relatively rare commodity on the Web, it is important to find ways to reward users, ideally by giving them something new and better that they did not get before, such as a non-linear site experience; customized service; asynchronous features; support of profile anonymity; liberal linking; support of search and multiple views; offerings that are small and cheap/free; and a willingness to ignore geography (Nielsen, 2000b). Notice how these gifts can add value to the user experience and support repeat traffic, all for very little extra expenditure. Until such time as the majority of Web sites find a way to simplify and enrich users' lives simultaneously, such small enhancements, easily detected by usability methods, will continue to hold a disproportionately positive value in users' minds. Illustrating this ease of detection, Nielsen (2000j) has shown that testing as few as five users will tend to uncover 85 percent of site usability problems, with a serious case of diminishing returns for testing additional users (§ 1; also see Krug, 2000, p. 146).

#### Integration with E-Healthcare

For all its current shortcomings, the Internet continues to re-invent itself, and in so doing, offers opportunities even in areas that have been historically resistant to technology, such as healthcare. "A new user logs on for the first time every 1.6 seconds" (Hurst & Gellady, 1999, p. 2) and "of the Internet users who have gone online for health or medical information, 47% are new users (less than six months on the Internet)" (Fox & Rainie, 2000, p. 8).

Moreover, valuable lessons have been learned from the failure of e-healthcare companies such as PlanetRx, OnHealth, Mother Nature, and (soon) Drugstore.com.

The business models just did not hold together, as they relied on advertiser support as the primary revenue stream . . . There are real opportunities to build a message sequentially from disease awareness to branding to data collection in subsequent pages, as the gold is in driving relationship marketing. But that requires a client capability that can create and deliver segmented, relevant information. Some have capitalized on this, but most have not. (Hone, 2000, p. 23)

Also, since "buying or searching for a healthcare product from an online pharmacy will be the first use of the Internet for healthcare purposes by many consumers and physicians . . . the various methods of submitting a prescription online should be clearly explained" (Datamonitor plc, 1999, pp. 187, 201). This is clearly an area where Opt-e-scrip can still distinguish itself, if its expected proven record of successful test results can restore some of the luster that was lost in the e-healthcare category in September 1999, when drkoop.com was faulted on its Web ethics. Still, similar ethical, quackery and privacy challenges exist.

The Federal Trade Commission estimates that doctors review only about half of the content on health and medical Web sites. There is significant concern—especially on the part of advocates for the chronically ill—that patients may harm themselves based on inaccurate information or products obtained on the Internet . . . fully 82% of those with Internet access—health seekers and non-seekers alike—say they are concerned about getting health information from an unreliable source online. (Fox & Rainie, 2000, p. 14)

For these reasons and many others, Opt-e-scrip Web-site usability is particularly crucial in establishing trust and credibility. To enlist the long-term participation of patients with chronic conditions, it is essential that Opt-e-scrip obtain the necessary knowledge on use patterns: ask these customers what they want to do online, design one's Web services, and then ask customers for advice and involve them in periodic review (Goldstein, 2000, p. 8).

One possible way to gain regular visibility is to add a unique type of toolbox or quick-access shelf to sites where users have a fairly predictable range of options that they typically employ. For example, some sites, such as Medscape, are now integrating a simplified browser (e.g., @Hoc Persistent Communications™; <http://www.athoc.com>), which incorporates such content as breaking news and special offers with alerts. Users benefit by being able to quickly and easily find information from Web sites with a minimum number of clicks. Through the personalization feature, users add their favorite sites to the toolbar, "skin" the browser, and personalize all of the content on the toolbar, including control of the buttons, links and search box. Beyond ease of use, this service enables companies to continually connect and interact with customers. The downside, however is that, like the PointCast screensaver of old, it could slow down browser speed horribly—a concern for many users, in a medium where speed (time) is a prime currency.

Another innovation that needs to be considered more closely is the idea of micropayments, especially since it has been shown that advertising cannot be a sustainable source of revenue in e-healthcare, as noted above. Also, because the dot-com health-site craze has faded, and with it any chance of a venture-capitalist bidding war, e-healthcare sites must turn to other means to bring in sorely needed capital.

From 1997 through about mid-2000, it was possible to build Internet services using a business model based on separating gullible investors from their money. Because this is no longer feasible, the focus is now shifting to separating customers from their money . . . users build commitment slowly, and typically start out by sampling the service and buying a few individual items. If websites are to earn money from impulse purchases, users must have an easy way to pay. The underlying infrastructure for this is still not in place. We need micropayments. (Nielsen, 2000i, ¶ 12, ¶ 20)

As of this writing, Nielsen (as mentioned in his speech, "The Fundamental Concepts of Web Usability," Nielsen, Tognazzini, Laurel, & Norman, 2000) estimates that micropayments will start to happen as soon as next year (2002). Amazon.com is already accepting micropayments based on an honor system (Amazon.com, 2001).

The last issue of integrating usability with e-healthcare involves the incorporation of usability testing specifically on both cyberchondriacs/health seekers and e-healthcare newbies; in the case of Opt-e-scrip, further targeted at those with mild to moderate chronic conditions. So long as funding continues to be an issue, even less expensive means than discount usability engineering may be needed to put a viable Web site in place. Luckily, several methods exist for deriving much of the benefit of more formal usability testing.

"Before you even begin designing your site, you should be testing comparable sites (actual competitors, or sites that are similar in style, organization or features to what you have in mind) . . . [it is] like having someone build a working prototype for you for free" (Krug, 2000, p. 151). One should also test comparable non-Web ways of completing the

tasks one tests on the Web, to see if any new ideas can be carried over and adapted.

Visits to brick-and-mortar customer sites also help to identify problems that are otherwise overlooked.

Next, when it comes time to hire a true Web-site designer, one should refuse the demo and actually check out the designer site personally, first “following the most interesting set of links to see where they lead (Do you know where you are? Do you know how to find related information?), and then returning to the home page to try to find specific information that is suspected to be somewhere on the site (Can you find it? If the information is not there, how long does it take before you feel confident that you have looked everywhere?)” (Nielsen, 1995b, ¶ 6-8).

In the new Web healthcare environment, one of the most compelling arguments that one can make is to practice what one preaches, and to under-promise and over-deliver; or, in the words of gastroenterologist Dr. David Kaufman (personal communication, March 16, 2001), in talking about patients, “They do not remember what you say; they may remember what you do; and they will always remember how you make them feel.”

Sample Opt-e-scrip Web pages (initially in print form) will be tested according to the above principles prior to full-scale launch in late summer 2001, and are located in Appendix D.

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**Appendix A:**  
**Additional Definition of Terms**

1. Bioavailability. The fraction of drug administered that reaches the central circulation, i.e., the circulating post-portal venous blood.

2. CGI Scripting. CGI (Common Gateway Interface) programming and scripting is a set of standards that define how communication takes place between a Web server and server-side applications. These standards provide the gateway through which data can pass between the Web server and a CGI application. By using CGI, developers can write applications that can provide some interactive element (such as accepting feedback from the end user) or a dynamic element (such as Web pages generated on demand, processing forms, accepting user input; Holzschlag, 2000, p. 736).

3. Collaborative Practice Pharmacy. Pharmacists participating in collaborative practice, through written agreement, share the responsibility for patient outcomes by solving problems related to drug therapy and by making decisions about the patient's pharmaceutical regimen. In return, the pharmacist must have access to patients and their health information and be able to conduct ongoing evaluations of the patient's condition and response to medication. The physician diagnoses the patient and prescribes the initial treatment. The pharmacist may then be authorized to monitor the patient's condition, to modify drug therapy as necessary, and to discontinue medications at the end of treatment. A set of pre-approved, written treatment protocols is required for each course of drug therapy. Highly qualified pharmacists can take care of routine testing, prescribing, patient counseling, and follow-up tasks, to better utilize physician resources.

4. Continuing Medical Education. A credentialing mechanism, sometimes available online (via a physician licensing number or other unique passwords), that allows

medical professionals to attend workshops and seminars, or complete a predetermined sequence of learning tasks, in obtaining an established number of credit hours per year required to maintain their licenses. CME provides the greatest degree of incentive when available on medical professionals' own time, and at their own pace.

5. Cookies. Cookies are small files of coded messages sent to a computer from a Web server to relay information such as Internet address, Internet service provider and operating system back to the server. Cookies were designed to customize and personalize Web-based services. They also enable Web sites to perform functions such as remembering user names when users log on, and indicating which areas of a site are visited most often. These tiny software programs keep a log of where people click, allowing sites to track customers' habits. Cookies are placed on consumers' computers when they first visit sites or use things like online calendars, personalized news services, or shopping carts (Business Week, 2000, p. 85).

6. Cyberchondriac. A term coined by the Louis Harris poll takers to describe Americans who use the Internet to look for healthcare information.

7. Discount Usability Testing Methods. The discount usability engineering method is based on the use of the following three techniques: scenarios (paper mock-ups or simple prototypes), simplified thinking aloud (i.e., bringing in some real users, giving them some typical test tasks, and asking them to think out loud while they perform the tasks), and heuristic evaluation (comparing results against 10 basic usability principles; see definition below; also see:

[http://www.useit.com/papers/web\\_discount\\_usability.html](http://www.useit.com/papers/web_discount_usability.html);

[http://www.useit.com/papers/heuristic/heuristic\\_list.html](http://www.useit.com/papers/heuristic/heuristic_list.html);

<http://www.zdnet.com/devhead/stories/articles/0,4413,2190669,00.html>;

[http://www.useit.com/papers/guerrilla\\_hci.html](http://www.useit.com/papers/guerrilla_hci.html))

8. Disease Management: Proactive, integrated care that includes identification and stratification of patients at risk—those with chronic diseases or likely to suffer a catastrophic event—and implementation of preventive programs and treatments to prevent or minimize crises . . . continuously analyzing, evaluating and improving the value of health care delivery across the spectrum of care settings. Chronic disease management involves five key elements: (a) patient selection (opt-in vs. opt-out enrollment), (b) timely data gathering, (c) ongoing monitoring, (d) early intervention, and (e) behavior reinforcement (Goldstein, 2000, p. 243). The Pareto Principle corresponds well to disease-management statistics that indicate “20% of the population (those with chronic diseases) accounts for 70% or more of the healthcare costs. Proactively managing the 20% of the population with chronic illness can lead to a drastic reduction in healthcare expenses” (Marhula & Shannon, 2000, p. 11).

9. E-Thesaurus. An enhanced search facility that uses a broader terminology range, so that if a user does not know the exact name of a product, the search engine is able to find items that resemble the user’s description. An excellent example is IntuiFind from Mercado Software (<http://www.mercado.com/solutions/index.html>).

10. Extranet. An extension of the intranet designed to incorporate external users with special access permissions to certain subsites (Nielsen, 2000b, p. 266).

11. Heuristic evaluation. The most popular of the usability inspection methods. Done as a systematic inspection of a user interface design for usability. The goal is to find the usability problems in the design so that they can be attended to as part of an

iterative design process. Heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the “heuristics”; also see: Nielsen, <http://www.useit.com/papers/heuristic/>).

12. HTML. HyperText Markup Language; a derivative of SGML (Standard Generalized Markup Language), an international standard for representing text in an electronic form that can be used for exchanging documents in an independent manner . . . HTML allows for the markup of text and the inclusion of images, as well as the ability to link documents together (Weinman and Green, 2000, p. 6). However, the true power of Web pages lies not in the static nature of HTML, but rather in their interactive capability (Holzschlag, 2000, p. 736).

13. IP Address. A number automatically assigned to a computer whenever connected to the Net. The numbers are used by network computers to identify a PC so that data can be sent to it. Addresses can be used in profiling and targeting (Business Week, 2000, p. 85).

14. Interaction design. What happens next when the user clicks (Krug, 2000, p. 4).

15. Interactive Voice Response. A system by which a phone receives a call and transfers it to a computer, where the caller then hears instructions prerecorded on the computer hard drive; typically a menu of options. The caller then enters data directly into the computer by pressing codes on the Touch-Tone pad or, if the system includes voice-recognition technology, simply by talking.

16. Keyword Mapping. Identifying, each week, what your customers search for most frequently, then programming your search engine to send users directly to the pages devoted to those products—instead of forcing them to sort through reams of data (i.e., to

organize based on the way customers buy, with a clear payoff from link labels, so they know how and why to bother proceeding; Hurst, 1999, as cited in "Four rules," 1999, ¶ 6).

17. Market Creator. "The market creator business model generates revenues by creating an online market for buying and selling goods and services which may not otherwise exist (Datamonitor plc, 1999, p. 210)." This model is particularly valuable in markets where the flow of information is poor, as it often brings together potential buyers who might otherwise not interact, or interact efficiently enough to sustain a longer-term relationship.

18. Opt-In/Opt-Out. Privacy choices that some Web sites offer to their visitors. In opt-out situations, the site is free to gather and sell information on users unless they specifically tell it not to by clicking on a button. With opt-in, gathering or selling user data is forbidden unless users click to give permission (Business Week, 2000, p. 85). The ideal is request marketing, distinguished from permission marketing in that participants are asked in advance what they want to receive, as well as whether they would be willing to continue receiving it. Related to permission marketing is drip-irrigation dialogue, which online drugstore PlanetRx used via forms [i.e., ensuring continuous dialogue by gathering information a little at a time] to collect information. After users registered, they had the option to answer additional questions about their drug allergies and medical conditions. In return, the company sent out e-mail warnings about drug interactions and provided other services relevant to a customer's specific medical needs, such as prescription refill reminders" (Peppers and Rogers, 1999, p. 44).

19. Personally Identifiable Information. Your name, address, or credit-card number, and other details linked to your real-world identity (Business Week, 2000, p. 85).

20. Platform for Privacy Preferences Project (P3P). P3P, developed by the World Wide Web Consortium (<http://www.w3.org/P3P>), is emerging as an industry standard, providing a simple, automated way for users to gain more control over the use of personal information on Web sites they visit. At its most basic level, P3P is a standardized set of multiple-choice questions, covering all the major aspects of a Web site's privacy policies. Taken together, they present a clear snapshot of how a site handles personal information about its users. P3P-enabled Web sites make this information available in a standard, machine-readable format. P3P-enabled browsers can "read" this snapshot automatically and compare it to the consumer's own set of privacy preferences. P3P enhances user control by putting privacy policies where users can find them, in a form users can understand, and, most importantly, enabling users to act on what they see.

21. Prognostics Company. A company providing goods and services to measure disease intervention through signs, symptoms or surrogate markers to forecast the probable course and/or outcome of a disease, as distinguished from diagnostics, genomics, proteomic, or biologics companies. Opt-e-scrip currently qualifies as this new type of healthcare business (Dr. Donald P. Reitberg, personal communication, April 18, 2001).

22. Rollover: a graphic that gets replaced by another graphic when the cursor is moved over it. Rollovers can be used to highlight buttons so that it is clear that they are clickable, to pop up a description of what each button is linked to, or to just add a little bit of 'sizzle' (Krug, 2000, p. 83).



23. Subsite. A collection of pages within a larger site that have been given a common style and a shared navigation mechanism . . . a home environment for a specific class of users or a specific type of usage within a larger and more general site (Nielsen, 2000b, p. 223).

24. Usability Test: A test where “one user at a time is shown something (whether it is a Web site, a prototype of a site, or some sketches of individual pages) and asked to either (a) figure out what it is (“get it”: understand the purpose of the site, the value proposition, how it is organized, how it works), or (b) try to use it to do a typical task (asking the user to do something, either exploratory or directed, then watching how well they do)” (Krug, 2000, pp. 141, 153).

25. Web Service. As distinguished from a static Web page or Web site, a Web service typically offers interactivity for users and compelling reasons to return—e-communities based on disease states, on-line support groups, purchase of products, and other services . . . the goal of a Web service is to move beyond information to facilitating access to care resources quickly and effectively through on-line technology. The emphasis is on customer service and transactions (e.g., product sales)” (Goldstein, 2000, p. 259).

26. XML, XSL, XSLT. Whereas HTML is about the display of content, XML (eXtensible Markup Language) is about creating, sharing and processing information. XML offers a way to define tags that are specific to a particular purpose and describe information consistently. This consistency means XML can be processed automatically, in a wide variety of situations. XML offers the promise of being able to improve interactivity between Web sites and databases. It can also be used to create mark-up

languages specifically suited to a topic. XML tags describe what categories contain, and each category can have its own “vocabulary,” making it possible to easily identify and exchange information (XML, 2000, ¶ 1; Castro, 1998, p. 19). Extensible Stylesheet Language (XSL) is a language for expressing stylesheets. It consists of a language for transforming XML documents, and an XML vocabulary for specifying formatting semantics. An XSL stylesheet specifies the presentation of a class of XML documents by describing how an instance of the class is transformed into an XML document that uses the formatting vocabulary (i.e., what the users see and how they interact; replaces Cascading Style Sheets in HTML). Extensible Stylesheet Language Transformations (XSLT) defines the transformations of XML, allowing documents and services to be repurposed.

**Appendix B:**  
**Questions Reflecting Goals and Expectations of**  
**Visitors to Health and Medicine Information Web Sites**

**General Navigation:**

1. Where am I? (relative to the Web as a whole, and also relative to the site's structure)
2. Whose site is this?
3. How much information is on this page?
4. Who is this information intended for?
5. Where can I go?
6. What does this site do [for me]? [or 'What can I do here?']
7. What kinds of information does this page contain?
8. How will I get where I want to go?
9. Where have I been?
10. How can I get back to where I once was?

**Purpose-Oriented**

11. How will I know if a site has what I am looking for?
12. What is in it for me?
13. How does this help me solve my problem?
14. How do I find the exact information I need?

15. What if I am not sure what to look for?

16. Will the information be right for me?

17. Can I trust this information?

18. Can I store what I find for later use?

**Topic- or Audience-Oriented**

19. Is the information up-to-date and accurate?

20. Does it reflect any particular stance or bias?

21. Is it for doctors or patients?

22. Can I search for a certain condition or illness?

23. Can I limit my search to information that will apply to my situation or needs (by age, gender, etc.)?

24. Is there a glossary available?

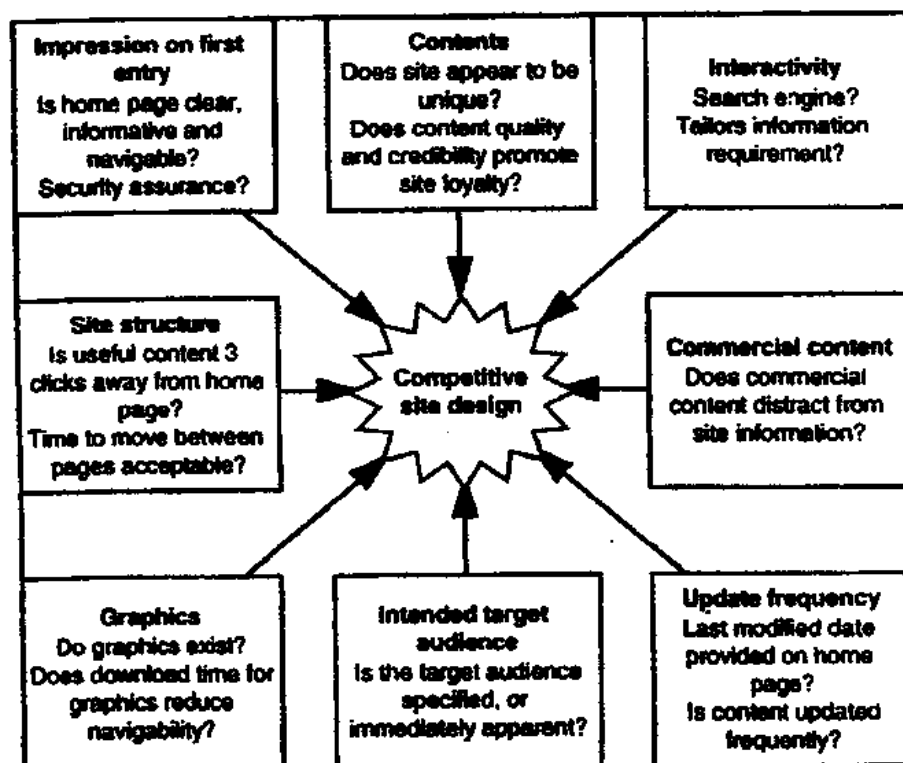
25. Can I talk to an expert who can help me make sense of this information?

(Fleming, 1998, pp. 212-213)

## Appendix C:

### Diagrams

## Site design is critical if content providers wish to remain competitive



Source: Datamonitor

## **Appendix D:**

**Master's Thesis Project:**

**Development of the Web Site Opt-E-Scrip**



# Opt-e-scrip



*Optimizing each prescription to the individual*

FOR MEDICAL PROFESSIONALS QUICKIE SURVEY

[HOW IT WORKS](#)

[CHRONIC DISEASES](#)

[ASK THE DOCS \(FAQs\)](#)

[ABOUT US](#)

[CONTACT US](#)

## HOW IT WORKS

[The Opt-e-scrip Solution](#)

[How the Kits Work](#)

[Kits Available](#)

[Glossary](#)

## CHRONIC DISEASES

[Allergy/GERD/Osteoarthritis/](#)

[Depression/ Related Links](#)

## ASK THE DOCS (FAQs)

[General Questions](#)

[Current Users](#)

[New Users](#)

## FOR MEDICAL PROFESSIONALS

[The Opt-e-scrip Process](#)

[Benefits](#)

[Links to Medical Journals and Conferences](#)

## QUICKIE SURVEY

## ABOUT US

[Management](#)

[Outside Directors](#)

Someday all chronic care drugs will be described this way ...



Do you sometimes wonder whether the medications your doctor prescribes actually work for you? Good question ... because all drugs work differently in each person. You are an individual, yet drugs are approved by the Food & Drug Administration (FDA) based on how they work in large groups of patients. Efficacy and

safety measures are based on the average response – not on how you, as an individual, will respond.

Maybe you are now taking an expensive medication that actually works no better than a placebo (sugar pill) or a less expensive generic or over-the-counter (OTC) drug. Additionally you could be exposing yourself to harmful side effects unnecessarily.


Now, there is a scientific, approved method for answering the following critical questions:

***Should I be on a chronic medication?  
Which medication is most effective for me?***

***What strength or dose of medication  
should I be taking?***

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**Opt-e-scrip**
*Optimizing each prescription to the individual*

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**HOW IT WORKS****The Opt-e-scrip Solution**

The Opt-e-scrip solution Opt-e-scrip is a relatively inexpensive system of patented diagnostic kits backed by a predictive database model. For certain disease categories, your doctor can prescribe a customized kit for you just like a standard prescription medicine. These kits can scientifically measure your individual reactions to certain drugs in a statistically valid way. After you use the kit, your doctor can confidently determine which medicine, if any, you should be taking.


Click below to find out more about:

- ▶ How the diagnostic kits work
- ▶ Types of diagnostic kits
- ▶ Conditions for which kits are currently available

Opt-e-scrip technology is a breakthrough method that can improve clinical outcomes for doctors and patients while also saving significant drug expenses. Consisting of a relatively inexpensive system of patented diagnostic kits, a prescribing decision model, and a database, Opt-e-scrip will statistically indicate what drug, if any, at what dose is optimal for an individual patient. Opt-e-scrip is a new paradigm in evidence-based medicine: a continuously updating database of therapeutic outcomes combined with individual patient data. The Opt-e-scrip system includes a self-administered diagnostic kit that is used to collect clinical results of drug performance for an individual patient. This data is then combined with results from a database of like patients. The result is an objective, statistical method of determining if drug therapy is called for, and if so, what is the most cost-efficient means of providing it. These test kits determine: a) if and when drug is better than placebo, b) when an alternate, lower-cost substitute may provide a better benefit than a branded product, and c) what dosage levels represent the optimal crossover point between efficacy and side effects. For the first time, consumers can now be assured that they are taking effective prescription medication, with tolerable side effects. If their conditions are not benefiting from drug therapy, Opt-e-scrip will also help determine whether a prescription medication is needed at all. Although Opt-e-scrip is able to use the Internet as a way of expediting the flow of information between pharmacists and medical professionals, it is not a traditional "Internet pharmacy," nor is it a repackager, manufacturer or wholesaler. The Opt-e-scrip product line is distributed through a mail-order pharmacy, with prescriptions written by trusted local doctors everywhere. The Opt-e-scrip team's combined clinical, epidemiological, biostatistical, manufacturing and marketing expertise, as well as patented methodologies, make Opt-e-scrip unique.

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ASK THE EXPERT

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**CHRONIC DISEASES**

- ▶ Allergy
- ▶ GERD (chronic heartburn)
- ▶ Osteoarthritis
- ▶ Depression
- ▶ Related Links

**Allergy**

Allergic Rhinitis Joint Council of Allergy, Asthma, and Immunology  
[http://www.jcaai.org/Param/Rhinitis/Complete/allergic\\_rhinitis.htm](http://www.jcaai.org/Param/Rhinitis/Complete/allergic_rhinitis.htm)

**GERD**

Gastro-esophageal reflux disease

All About GERD (drkoop.com) [http://www.drkoop.com/conditions/gerd/page\\_19\\_73.asp](http://www.drkoop.com/conditions/gerd/page_19_73.asp)

American College of Gastroenterology

<http://www.acg.gi.org/>

[http://www.acg.gi.org/acg-dev/patientinfo/frame\\_gerd.html](http://www.acg.gi.org/acg-dev/patientinfo/frame_gerd.html)

<http://pharminfo.com/disease/gerd/gerdfaq1.html>

The American Gastroenterological Association

<http://www.gastro.org/>

GERD Information Resource Center (sponsored by AstraZeneca LP)

<http://www.gerd.com/>

Digestive Disease Week

<http://www.ddw.org/index.html>

**Osteoarthritis**

Osteoarthritis: a self-care guide (Mayo Clinic)

<http://www.mayohealth.org/mayo/9706/htm/osteoart.htm>

**Depression**

Other keywords: serotonin re-uptake inhibitors (SRI), serotonin and norepinephren re-uptake inhibitors (SSRI), anti-anxiety, new antidepressants

**Support-Group Links**

Healing Depression

<http://www.healingdepression.com/default.asp?content=R2#groups>

American Psychiatric Association

<http://www.psych.org/>

Depression and Related Affective Disorders Association

<http://www.med.jhu.edu/drada/>

National Alliance for the Mentally Ill

<http://www.nami.org/>

National Depressive and Manic-Depressive Association

<http://www.ndmda.org/>

National Foundation for Depressive Illness, Inc.

<http://www.depression.org/>

National Institute of Mental Health

<http://www.nimh.nih.gov/>

National Mental Health Association

<http://www.nmha.org/>

Physicians Postgraduate Press (megalink sites)

<http://www.psychiatrist.com/links/>

<http://www.psychiatrist.com/links/links2.htm>

The Samaritans

<http://www.samaritans.org.uk/>

## Hypertension

PDR's Getting Well Network—Hypertension

[http://www.pdr.net/gettingwell/hypertension/consumers/m\\_6\\_97.html](http://www.pdr.net/gettingwell/hypertension/consumers/m_6_97.html)

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**ASK THE DOCS (FAQs)****General Questions**

- ▶ **How long will the test period last?**  
Each test kit will have its own duration based on the disease condition and drugs. The approximate range of duration is from four to 12 weeks.
- ▶ **How much does a test kit cost?**  
Each test kit will be priced depending on the duration of the kit and the specific cost of the drug in the kit. The kit price, however, will be no more expensive than a normal course of drug therapy for the same period of time.
- ▶ **Will my insurance pay for the test kit?**  
We are working with managed care companies to accept our kits on their "formulary" and pay for the kits. We believe it is in the best interest of the patient for the insurance companies to pay for this breakthrough technology.
- ▶ **How do I know the kits really work?**  
Each kit has been extensively tested prior to being offered to the public by very-well-qualified research professionals.
- ▶ **Why hasn't the doctor prescribed this before?**  
Opt-e-scrip kits contain a patented technology that has not been available to physicians until now.
- ▶ **Will I be taking "experimental" drugs?**  
No. All drugs included in Opt-e-scrip kits have been approved by the FDA for use in human applications.
- ▶ **Why can I only get this through your pharmacy?**  
Each kit is individualized, and requires control by our pharmacy to track which patients receive specific kits. Opt-e-scrip is about "customized" medicine for the individual, so tight control of kits and questionnaires ensures correct interpretation of the results.
- ▶ **Who will get the test results?**  
Test results will be provided directly to your physician. In addition, your managed care provider will have access to the results, to know what the recommended course of drug therapy should be.
- ▶ **Are the results of the test kept confidential?**  
Absolutely. Only you, your physician and managed care company will be able to connect the results of your test to you. Opt-e-scrip will never release specific patient identification to outside companies without your authorization.
- ▶ **Who will know what drugs I will be taking?**  
Opt-e-scrip and your physician will know what drugs are included in the kit. In addition, only Opt-e-scrip will know which specific drug you are taking each day, to avoid biasing the results of the test.

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**ABOUT US****Management**

The founders and management of Opt-e-scrip are senior pharmaceutical executives who have worked together successfully in the past. High-profile executives with healthcare or high-technology backgrounds have already been recruited to serve as outside directors. A brief summary of their names and biographies:

- ▶ **Frederic J. Huser Founder, Chairman and CEO/Director**  
President of Novartis North America OTC Division until August 31, 2000, with 800 employees, \$600 million in sales and a \$175 million asset base. Over 25 years' experience at Fortune 100 companies, including Procter & Gamble, Burroughs Wellcome, GlaxoWellcome, Richardson-Vicks and Chesebrough-Ponds. Duke University B.A. and Harvard Business School M.B.A.
- ▶ **Dr. Donald Reitberg Founder, Vice Chairman, President of Scientific Affairs/ Director**  
Previously Vice President of Research & Development at Novartis Consumer Health. Over 20 years' experience in clinical research and clinical operations and in Rx and OTC categories with such companies as Pfizer, Sterling Drug, American Home Products and SmithKline Beecham. B.A., Hunter College; B.S., Pharmacy, University of Utah, and PharmD., State University of New York at Buffalo. Also, Fellowship in Clinical Pharmacokinetics and Pharmacology at Millard Fillmore Hospital.
- ▶ **Richard Gleber Vice President of Marketing**  
Previously Vice President of Marketing with Novartis Consumer Health. Over 15 years' experience in consumer and pharmaceutical brand marketing and operations with Novartis, Glaxo Wellcome, Burroughs Wellcome and Clorox. B.S., Florida State and M.B.A., Georgia Tech.
- ▶ **David Klein Vice President of Legal**  
Previously, Vice President/Senior Counsel for Warner-Lambert. Over 25 years' experience with Rx legal areas, including managed care contracts, Medicaid rebates, Internet pharmacy agreements, disease management issues, patent confidentiality, and patent prosecution.
- ▶ **Robert Jones Vice President of Finance**  
Previously Vice President of Sales and Marketing with Purepac Pharmaceutical Company. More than 15 years of prescription, generic and consumer pharmaceutical industry experience in marketing, sales, financial planning and staff management. Past roles include Controller, Consumer Healthcare Division, Burroughs Wellcome Company. B.S., Cornell University, and University of North Carolina M.B.A.
- ▶ **James Ciccone Vice President, Product Supply**  
Over 18 years' experience in all facets of product supply, including planning, procurement, manufacturing and contract manufacturing. Currently Associate Director of Third Party Contract Operations for Novartis Consumer Health. B.A. in Business Administration from Rutgers.
- ▶ **Dr. Eve del Rio Vice President, Clinical Research & Operations**  
Over 14 years of industry experience; previously, was director of clinical research for Novartis Consumer Health, where she was responsible for research and FDA submissions in several areas of new pharmaceuticals. Previously, she was associate director, Clinical and Medical Research, for SmithKline Beecham (Consumer Healthcare), and senior research scientist, Medical and Clinical Affairs, for Whitehall-Robins Healthcare (division of American Home Products). She holds a Ph.D. from Columbia University, received her B.A. in Zoology from Drew University, Madison, N.J., and is a published author of several papers.

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**CONTACT US**

- **Opt-e-scrip, Inc.'s national headquarters is located at:**

25 Lindsley Drive, Suite 203  
Morristown, NJ 07960-4454  
Toll-Free: 1.866.OPTESCRIP (678.3774)  
Fax: 973.401.1603

- **Directions:**

**From the South:**

Route 287 to Exit 36A (Morris Avenue). Follow toward Columbia Turnpike/Florham Park. At the traffic light for Whippany Road (you will see a Westin hotel on the corner), go straight and down the hill of Lindsley Drive. We are the last building on the left, second floor.


**From the North/West:**

Route 287 to Exit 36 (Lafayette Ave./Ridgedale Ave. to Morris Ave.). Follow directions as shown above.

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The Opt-e-scrip Process - Benefits - Links to Medical Journals & Scientific Papers

## FOR MEDICAL PROFESSIONALS

### The Opt-e-scrip Process

#### ..Single-Patient Clinical Trial Flowchart

1. Physician accesses Opt-e-scrip via his or her chosen communication method and conveys prescription (which test kit desired) and patient insurance-coverage information
2. Opt-e-scrip pharmacists fill prescription and send it and questionnaire to patient via overnight mail. Depending on the type of kit, each kit will contain two blinded active drugs, or one active drug and one inactive placebo.
3. Patient begins taking blinded drugs on a defined administration schedule. The individual "N of 1" clinical trial is administered for 12 to 24 weeks, with three to four crossover points. Each kit contains all clinical drug or inactive placebo pills, and all instructions and information-collection materials.
4. Patient fills out quality-of-life questionnaire at defined crossover points. Depending on therapeutic category, a healthcare professional may also fill out an objective assessment of signs/symptoms or physiological markers at some crossover points.
5. Questionnaires are returned to Opt-e-scrip. Only Opt-e-scrip can analyze the data, because placebo and active drug are administered in random patterns and look identical, thus eliminating any bias in results.
6. Code is broken. "N-of-1" analysis is performed and augmented, using Bayesian and other statistical approaches on data from group outcomes for like populations.
7. Profile is delivered to the physician via his or her medium of choice (can be real-time), and the individual's data is added to the database.
8. Physician advises patient to take no drug, switch to a different drug, or change dose, depending on type of test prescribed. Additional test kits can also be prescribed, based on a prescribing decision model for either new or existing patients.
9. Users open an account with the pharmacy, submitting credit and insurance information. The pharmacy is licensed to sell prescription drugs by the state in which it operates and in those states to which it sells, if an out-of-state license is required.
10. After establishing an account, users must submit a valid prescription. Doctors can call it in, or users can deliver it to the pharmacy by phone, fax or mail. Some online pharmacies send products from a central spot, while others allow users to pick the prescription up at a local drugstore. The prescribed kits are usually delivered overnight, but slower fulfillment (snail mail) may be prescribed under unusual circumstances. Users can ask questions of the pharmacist, either through e-mail or a toll-free number.
11. Essential components of the single-patient evaluation product consist of convenient, pocket-sized cards that contain up to a one-week supply of drug or placebo in blister packages labeled with the day and time of dosing. The cards each correspond to one of multiple periods of treatment and contain daily regimens of the requested test drugs
12. In an emergency, calling the Opt-e-scrip 24-hour emergency service can serve to break the code clearly labeled on each card. At various times during the evaluation, the program prompts the patients to fill out the questionnaires that measure numerous efficacy and safety variables. At the end of the study, the questionnaires are returned and results are evaluated by a sophisticated computer program, which guides individual results based on group outcomes. These results are presented in report form, and statistical analyses and graphs are provided to the physician. Relevant data on treated populations may also be included. All information generated will be treated with strict adherence to confidentiality conventions for purposes of use other than by the patient's physician.



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## FOR MEDICAL PROFESSIONALS

### Benefits for Medical Professionals

- ▶ To physicians and medical professionals:
  - Allows prescription of medication that works for chronic illnesses, with acceptable side effects, and as part of a patient's total drug regimen
- ▶ Statistically valid way to deliver effective healthcare by:
  - putting only patients who respond to drug therapy on drug
- ▶ switching patients who respond to drug therapy but with unacceptable side effects to another drug/dose
- ▶ Facilitates clinical decision-making, rationalizing the use of any drug therapy for chronic conditions
- ▶ Identifies optimal drug therapy and dosing on an individual-patient basis · Optimizes time otherwise spent on overwhelming amounts of trial-and-error paperwork and patient visits (i.e., allows focus on one's practice and patients, with less administrative distraction or "red tape")
- ▶ Offers freedom to pursue best practices outside of MCO formulary issues, thus regaining control over prescribing guidelines
- ▶ Way to generate more revenue through follow-up patient visits; also, capitation programs become more profitable
- ▶ Way to regain control over physician/patient relationship affected by external influences
- ▶ Way to minimize malpractice insurance costs · Overcomes Phase III FDA approval deficiencies of mismatches with the homogeneous group tested, impressive placebo results, and significant non-response rates
- ▶ Availability of Continuing Medical Education (CME) credits

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How Opt-e-scrip Prescriptions Work | Opt-e-scrip Medical Economics | Opt-e-scrip Managed Care

### FOR MEDICAL PROFESSIONALS

#### Links to Medical Journals and Conferences

American Academy of Family Physicians

<http://www.aafp.org/>

<http://www.aafp.org/assembly/>

American Family Physician

<http://www.aafp.com/aafp/>

Medical Economics

<http://www.medec.com/>

Physicians Money Digest

<http://www.pmdnet.com/>

JAMA

<http://jama.ama-assn.org/>

Managed Care

<http://www.managedcaremag.com/>

New England Journal of Medicine

<http://www.nejm.com/>

Monthly Prescribing Reference

<http://www.prescribingref.com/>

Practical Gastroenterology

<http://www.practicalgastro.com/>

American Journal of Gastroenterology

<http://www-east.elsevier.com/ajg/>

<http://www-east.elsevier.com/ajg/issues/9406/ajg1123fia.htm>

Gastroenterology

<http://www.gastrojournal.org/>

Gastroenterology and Endoscopy News

<http://www.gastroendonews.com/index.html>

Archives of General Psychiatry

<http://archpsyc.ama-assn.org/>

American Journal of Psychiatry

<http://ajp.psychiatryonline.org/>

Journal of Clinical Psychiatry

<http://www.psychiatrist.com/>

Psychiatric Times

<http://www.psychiatrictime.com>

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**QUICKIE SURVEY**

To improve our service and product line to our patients, we'd like to ask you some questions:

1. How did you hear about Opt-e-scrip?
2. Would you consider asking your doctor to prescribe an Opt-e-scrip kit? Yes ☐ No ☐  
If yes, for what disease category? ☐ Allergy  
☐ GERD  
☐ Osteoarthritis  
☐ Depression  
☐ Other
3. Are there any other categories for which you'd like to see a diagnostic kit developed?
4. Are you currently taking a prescription for any of the following categories: Yes ☐ No ☐ GERD (chronic heartburn)  
Yes ☐ No ☐ Allergic Rhinitis  
Yes ☐ No ☐ Osteoarthritis  
Yes ☐ No ☐ Depression (mild to moderate)
5. If you are taking a prescription drug for one of the categories listed above, was the doctor that prescribed it for you a primary care physician (e.g., Family Practitioner, GP or Internist) or a specialist (e.g., GE, Allergist, Psychiatrist)?  Family Practitioner ☐
6. Do you currently have prescription drug benefits? Yes ☐ No ☐
7. If you would like for us to send you health or medical information, please provide your email address:
8. Finally, is there any other information we should be providing on this website?

If you are interested in having your doctor prescribe an Opt-e-scrip test kit for your chronic condition, please provide us with his or her name, specialty and location, below, and we will send a follow-up request to your doctor.

My Doctor's Name: My Doctor's Specialty (e.g., general practice): City: State: Phone (optional):